#### Available Online

# JOURNAL OF SCIENTIFIC RESEARCH

J. Sci. Res. **12** (2), 209-214 (2020)

www.banglajol.info/index.php/JSR

## Moments of Inertia of SDIBs in A = 190 Mass Region using VMI Model

P. Jain<sup>1\*</sup>, A. Goel<sup>1</sup>, S. K. Mandal<sup>2</sup>

<sup>1</sup>Amity Institute of Nuclear Science and Technology, Amity University, Uttar Pradesh-201303, India <sup>2</sup>Department of Physics and Astrophysics, University of Delhi, Delhi-110007, India

Received 20 September 2019, accepted in final revised form 26 December 2019

#### Abstract

A lot of identical bands are known at present in the Normal Deformed (ND) region. In our study of the occurrence and properties of identical bands in Super-Deformed (SD) nuclei we first applied the modified Variable Moment of Inertia (VMI) model to extract the band-head spin of Super-Deformed bands. The calculated transition energies, level spins and dynamic moment of inertia are systematically examined. Then, in the framework of theoretical model several identical bands are identified. The kinematic and dynamic moment of inertia have been calculated for the six pairs of Super-Deformed Identical Bands (SDIBs) which was not reported earlier in the literature. Thus, the results are significant. In all the cases  $J^{(2)}$  is significantly higher than  $J^{(I)}$  over a large range of frequency.

Keywords: Super-Deformed band; Identical band; VMI; BFM.

#### 1. Introduction

The discovery of Identical Bands (IBs) in both Super-Deformed and Normal Deformed bands surprised and initialized many new experimental as well as theoretical studies [1, 2]. Observation of rotational bands in two different nuclei which have nearly same transition energies E within  $\pm 3keV$  and nearly identical moment of inertia (dynamic) called identical bands was long believed would be difficult in nuclear physics. Therefore, finding such rotational bands increased the considerable interest in the field of nuclear physics. These identical bands exist at both low and high spins and thus describe many features of Super-Deformed and Normal Deformed bands. The first pair of SD identical bands was an excited band in  $^{151}Tb$  whose energies were identical to yrast band of  $^{152}Dy$  [3]. Later six identical SD bands found in  $^{194}Tl$  [4]. In the past years, there have been a lot of theoretical works presented on various nuclear models to observe IBs both in ND and SD nuclei [5-12]. The above study motivated us to study the various features of SDIBs in A = 190 mass region. So the purpose of this work is to point out the existence of IBs in the

\_

<sup>\*</sup>Corresponding author: <u>poonam.jn1@gmail.com</u>

SD nuclei with the help of modified VMI model and examine the behaviours of kinematic and dynamic moments of inertia.

The paper is organised as follows: A brief description of our approach to predict the level spin and band-head spin along with the calculation for kinematic and dynamic moments of inertia are presented in section 2. In Section 3 we present the obtained results for IBs in A = 190 mass region for SD nuclei. Finally, conclusion is given in section 4.

## 2. A Brief description of the VMI Model

The complete explanation of VMI model is described in literature [13-15]. The energy level of  $I_0 = 0$ , the ground-state bands in even-even nuclei are represented as:

$$E_I(J) = \frac{1}{2}C(J_I - J_0)^2 + \frac{1}{2}\left[\frac{I(I+1)}{J_I}\right]$$

The cubic equation is taken from the model. This cubic equation has one real root for any finite positive value of  $J_0$  and C. The cubic equation is given as:

$$J_I^3 - J_I^2 J_0 - ([I(I+1)]/2C) = 0$$

The transition energy for SD band is defined as [16]:

$$E_{\gamma}(I \to I - 2) = \frac{1}{2J_0} \left[ I(I+1) - (I-2)(I-1) \right] + \frac{1}{8CJ_0^4} \left( \left[ I(I+1) \right]^2 - \left[ (I-2)(I-1) \right]^2 \right)$$

In this equation, the parameters  $J_0$  and C are determined by fitting the experimentally known transition energies by using the Best-Fit Method (BFM). To find the rotational frequency  $\hbar\omega$ , the kinematic  $J^{(I)}$  and dynamic  $J^{(2)}$  moment of inertia using literature [13-15], we have written an equation by differentiating the energy with respect to I(I+1) and using the chain rule, we can extract  $\hbar\omega$ ;  $J^{(I)}$  and  $J^{(2)}$  from their definitions:

$$\begin{split} \hbar \omega &= \frac{dE}{d[I(I+1)]}, \\ J^{(1)} &= \hbar^2 \big[ I(I+1) \big]^{1/2} \bigg( \frac{dE}{d[I(I+1)]} \bigg)^{-1} \approx \frac{2I-1}{E_{\gamma}(I \to I-2)} \\ J^{(2)} &= \hbar^2 \bigg( \frac{d^2E}{d[I(I+1)]^2} \bigg)^{-1} \approx \frac{4}{E_{\gamma}(I+2 \to I) - E_{\gamma}(I \to I-2)} \end{split}$$

The  $J^{(1)}$  moment of inertia is a direct measure of the transition energies while  $J^{(2)}$  is obtained from differences in transitions energies (relative change in transition energies). The  $J^{(1)}$  kinematic moment of inertia and  $J^{(2)}$  dynamic moment of inertia are plotted with  $(\hbar\omega)$  rotational frequency to obtain the identical bands for SD nuclei.

Table 1. Band head moment of inertia, experimental transition energies, calculated transition energies, rotational frequencies along with kinematic  $J^{(1)}$  and dynamic moments of inertia  $J^{(2)}$  for SDIBs in A=190 mass region are given. The first row shows the band head moment of inertia  $(J_0)$ , the second row gives the estimated spin, the third and fourth rows gives the experimental and calculated transition energies respectively. In the fifth row the rotational frequencies are given. The kinematic and dynamic moment of inertia are presented in the sixth and seventh row respectively.

| $\frac{191}{70} Au(b2)$   |   |   |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
|---|---|---|--|--|--|--|--|--|--|---|--|--|--|---|--|-------------------------|--------------------------------------|----------------------|
|   | 0.  | 0929  |  |  | 1  |  |  |  | 1  |   |  |  |  |   | Т  |                         |                                      |                      |
| J <sub>0</sub><br>Estimated Sp  | in 20   | ).5   | 22.5<br>437  | 24.5   | 26.5   | 28   |  | 30.5<br>584  | 32.5<br>618  | 34<br>65  |  |  | 38.5<br>716  | 40.5  |  |                         |                                      |                      |
| $\frac{E_{exp}}{E_{cal}}$   | 35  | 8 04  | 437 25   | 475.66   | 513  | 8 54   | 9 74   | 585 27   | 619.6  |   |  | 684.85   |  | 744.64  | 1  | -                       |                                      |                      |
| $\hbar\omega$   | 20  | 8.82  | 228.23   | 247.21   | 1 265.7  | 73 28  | 3.75   | 301.24   | 318.1  | 14 33   | 4.44   | 350.08   | 365.02   |   |  |                         |                                      |                      |
| $J^{(1)}$   |   |   |  |  |  |  |  | 0.0991   |  |   |  | 0.1022   |  |   |  |                         |                                      |                      |
| $\mathcal{J}^{(2)}$   | 0.  | 1020  | 0.1042   | 0.1066   | 0.109  | 0.1  | 1126   | 0.1162   | 0.120  | 0.1   | 252  | 0.1307   | 0.1371   |   |  |                         |                                      |                      |
| $T_{Tl(b1)}$  |   | 0928  |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
| $\mathcal{J}_0$ Estimated Sp  | in 15   | 3.5   | 15.5   | 17.5   | 19.5   | 21   |  | 23.5   | 25.5   | 27  | .5   |  | 31.5   | 33.5  | 35.8                                       | 5 3                     | 7.5                                  |                      |
|   | 1 27  | 7   | 318  | 359  | 399  | 43   | 8  | 477  | 515  | 55  | 1  |  | 622  | 656   | 690  | 7                       | 21                                   |                      |
| Ecal  |   |   | 317.87   | 358.53   | 1 398.5  | 7 22   | 7.77   | $\frac{476.22}{247.51}$  | 513.8  |   |  | 586<br>301.62  | 620.47   | 653.78  |  |                         | 16.47                                |                      |
| 7(1)  |   |   |  |  |  |  |  | 0.0966   |  |   |  | 0.0989   |  |   |  |                         |                                      |                      |
| $J^{(2)}$   |   |   |  |  |  |  |  | 0.1065   |  |   |  | 0.1160   |  |   |  |                         |                                      |                      |
| $^{191}Ha(b2)$  |   |   |  | •  |  |  |  |  | •  |   |  |  |  |   | •  |                         |                                      |                      |
| $\mathcal{J}_0$ Estimated Sp $E_{exp}$  | 0.  | 0944  |  |  |  |  |  |  |  |   |  |  |  |   | 1  |                         |                                      |                      |
| Estimated Sp<br>Eexp  | in 12   | .2  | 203  | 16.5   | 18.5   | 20   |  | 22.5<br>450  | 24.5<br>488  | 26<br>52  |  |  | 30.5<br>597  | 32.5<br>632                                     | 34.5<br>666                                |                         | 6.5                                  | 38.5<br>733          |
| $E_{theo}$ $\hbar\omega$  | 25  | 1.46  | 292.2  | 332.41   |  | 41   | 0.9  | 449.04   | 486.3  | 32 52   | 2.69   | 558.06   | 592.36   | 625.5   | 657  | .41 6                   | 88.02                                | 717.24               |
| $J^{(1)}$   | 13  | 35.92   | 156.15   | 176.10   | 195.7  | 73 21  | 4.99   | 233.84   |  |   |  | 287.60   |  |   |  |                         |                                      |                      |
| $\frac{\mathcal{J}^{(1)}}{\mathcal{J}^{(2)}}$   | 0.  | 0954  | 0.0958   | 0.0963   | 0.096  | 38 0.0   | 0974   | 0.09780 $0.1073$   | 0.098  | 87 0.0  | 191  | 0.1003   | 0.1013   | 0.1023  | 0.10                                       | 034 0                   | 1960                                 |                      |
| 193 Hg(b2)  | 110.  | 0982  | 0.0993   | 0.1010   | 0.102  | 28 0.1   | .043   | 0.1073   | 0.10   | 55 0.1  | 131  | 0.1166   | 0.1207   | 0.123.  | 5 0.13                                     | 0710                    | .1309                                |                      |
| $\mathcal{J}_0$   | 0.  | 0936  |  |  | _  |  |  |  |  |   |  |  |  |   | т —  |                         |                                      |                      |
| $\mathcal{J}_0$ Estimated Sp $E_{exp}$  | in 12   | 2.5   | 14.5   | 16.5   | 18.5   | 20   |  | 22.5   | 24.5   | 26  | .5   |  | 30.5   | 32.5  | 34.5                                       |                         | 6.5                                  | 38.5                 |
| Eagl  | 25  | 3.63  | 295<br>294.74  | 335.31   | 374  | 26 41  | 4.52   | 451<br>453.02  | 488  | 52  | 7.39   | 560<br>563.12  | 595<br>597.77  | 629<br>631.28                                   | 662  |                         |                                      | 726<br>724.09        |
| $\frac{\hbar \omega}{\mathcal{J}^{(1)}}$  | 13  | 37.09   | 157.51   | 177.64   | 1 197.4  | 15 21  | 6.88   | 235.92   | 254.5  | 51 27   | 2.63   | 290.22   | 307.26   | 323.7   | 1 339                                      | .51 3                   | 54.65                                | - 2.00               |
| $\mathcal{J}^{(1)}$   | 0.0   | 946   | 0.0950   | 0.0954   | 1 0.959  | 0.0  | 965  | 0.0971   | 0.097  |   |  | 0.0995   |  |   |  |                         |                                      |                      |
| $\mathcal{J}^{(2)}$   | 0.  | 0973  | 0.0986   | 0.1001   | 0.101  | 9 0.1  | 1039   | 0.1062   | 0.108  | 89 0.1  | 120  | 0.1154   | 0.1194   | 0.1240  | 0.12                                       | 92 0                    | .1352                                |                      |
| $191_{Hg(b3)}$  |   | 0044  |  |  |  | $\overline{}$  |  |  | ,  | $\overline{}$   |  |  |  |   | _  | $\overline{}$           |                                      |                      |
| Estimated Sp  | in 19   | 0944  | 15.5   | 17.5   | 19.5   | 21   |  | 23.5   | 25.5   | 27  | .5   |  | 31.5   | 33.5  | 35.5                                       | 9                       | 7.5                                  |                      |
| Eern  | 27  | 2   | 313  | 353  | 392  | 43   | 0  | 467  | 504  | 54  | 0  | 575  | 609  | 643   | 676  | 7                       | 09                                   |                      |
| $\frac{E_{cal}}{\hbar \omega}$  | 27  | 1.89  | $\frac{312.38}{166.17}$  | 352.29   | 391.5  | 55 43  | 0.07   | $\frac{467.79}{243.11}$  | 261  | 33 54   | 0.51   | 575.35<br>296.11   | 609.07   | 641.6   | 672  | 88 7                    | 02.81                                |                      |
| $\sigma(1)$   |   |   |  |  |  |  |  | 0.0983   |  |   |  | 0.1008   |  |   |  |                         |                                      |                      |
| $\mathcal{J}^{(2)}$   | 0.  | 0988  | 0.1002   | 0.1019   | 0.108  | 38 0.1   | 1060   | 0.1086   | 0.111  | 15 0.1  | 148  | 0.1186   | 0.1229   | 0.1279  | 0.13                                       | 337                     |                                      |                      |
| 193 Pb(b4)  |   |   |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
| 20  | 0.0941  |   |  |  |  |  |  |  |  |   |  |  | 1 1  |   |  |                         | 1                                    |                      |
| Estimated Spin  | 13.5<br>273   | 15.5<br>313   |  |  |  | 23.5<br>167  | 25.5<br>504  | 27.5   |  | 31.5  | 33.5<br>645  | 35.5<br>676  | 37.5   |   |  |                         |                                      |                      |
| $E_{exp}$ $E_{cal}$   | 273<br>272.77   | 313.4   | 353,45   | 392.84   | 431.51   | 169.37   | 506.3  | 5 542.37   | 577.35   | 610   | 643.   | 91 675.32  | 705.4  |   |  |                         | +                                    | +                    |
| hω  | 146.54  | 166.71  | 186.57   | 206.09   | 225.22   | 243.93   | 262.1  | 8 279.93   | 297.14   | 313.78  | 329.   | 81 345.18  |  |   |  |                         |                                      |                      |
| $J^{(1)}$   |   |   |  |  |  |  |  | 8 0.0996   |  |   |  |  |  |   |  |                         |                                      |                      |
| $J^{(2)}$   | 0.0985  | 0.0999  | 0.1015   | 0.1035   | 0.1057   | 0.1082   | 0.111  | 0.1143   | 0.1181   | 0.1224  | 0.12   | 73 0.1330  |  |   |  |                         |                                      |                      |
| $^{196}Pb(b3)$  |   |   |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
| $\mathcal{J}_0$<br>Estimated Spin   | 0.0918  | 13  | 15   | 17   | 19 :   | 21<br>128  | 23<br>466  | 25   | 27   | 29  | 31   | 33   |  |   |  |                         | +                                    |                      |
| Earn  | 227   | 268   |  |  | 388  |  |  |  |  | 576   | 611  | 646  |  |   |  |                         |                                      |                      |
| $\frac{E_{cal}}{\hbar \omega}$  | 225.96  | 267.62  | 308.57   | 348.67   |  | 125.92   | 462.8  | 3 498.45<br>2 257.78   | 532.65   | 565.33  |  |  | 1  |   |  |                         | +                                    |                      |
| $\mathcal{J}^{(1)}$   |   |   |  |  |  |  |  | 2 0.0983   |  |   |  |  |  |   |  |                         |                                      |                      |
| $T^{(2)}$   |   |   |  |  |  |  |  | 3 0.1169   |  |   |  |  |  |   |  |                         |                                      |                      |
| 196 Pb(b1)  |   |   |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
| $\mathcal{J}_0$<br>Estimated Spin   |   |   |  |  |  |  |  |  |  |   |  |  |  |   |  |                         |                                      |                      |
| Estimated Spin  | 0.0872  |   | 10   |  | 10   |  | 20   | 20   | 24   | ne  | 26   | 20   | 22   | 24  | 10   |                         |                                      |                      |
| Ecxp  | 8<br>171  | 10<br>216   | 260  | 303  | 346  | 388  | 20<br>429  | 469  | 509  | 26<br>547   | 28<br>584  | 30<br>621  | 655  | 34 3<br>689 7                                   | 36<br>720                                  |                         |                                      |                      |
| E <sub>cal</sub>  | 8<br>171<br>170.99  | 10<br>216<br>215.81   | 260<br>260.08  | 303.69   | 346.52   | 388<br>388.45  | 429  | 469<br>8 469.17  | 509<br>507.73  | 547<br>544.93   | 584  | 30<br>621<br>66 614.8  | 655<br>647.23  | 689 1<br>677.85 1                               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$   | 8<br>171<br>170.99<br>96.70   | 10<br>216<br>215.81<br>118.97   | 260<br>260.08<br>140.94  | 303<br>303.69<br>162.55  | 346<br>346.52<br>183.74  | 388<br>388.45<br>204.46  | 429<br>429.3<br>224.6  | 469<br>8 469.17<br>4 244.23  | 509<br>507.73<br>263.17  | 547<br>544.93<br>281.40   | 584<br>580.<br>298.  | 30<br>621<br>66 614.8<br>86 315.51   | 655<br>647.23<br>331.27  | 689<br>677.85<br>346.09                         | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\frac{E_{cal}}{\hbar \omega}$ $\tau^{(1)}$   | 8<br>171<br>170.99<br>96.70<br>0.0877   | 10<br>216<br>215.81<br>118.97<br>0.0880   | 260<br>260.08<br>140.94<br>0.0884  | 303<br>303.69<br>162.55<br>0.0889  | 346<br>346.52<br>183.74<br>0.0895  | 388<br>388.45<br>204.46<br>0.0901  | 429<br>429.3<br>224.6<br>0.090   | 469<br>8 469.17<br>4 244.23<br>8 0.0916  | 509<br>507.73<br>263.17<br>0.0926  | 547<br>544.93<br>281.40<br>0.0936   | 584<br>580.<br>298.<br>0.09  | 30<br>621<br>66 614.8<br>86 315.51<br>47 0.0960  | 655<br>647.23<br>331.27<br>0.0973  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ $\mathfrak{I}^{(2)}$   | 8<br>171<br>170.99<br>96.70<br>0.0877   | 10<br>216<br>215.81<br>118.97<br>0.0880   | 260<br>260.08<br>140.94<br>0.0884  | 303<br>303.69<br>162.55<br>0.0889  | 346<br>346.52<br>183.74<br>0.0895  | 388<br>388.45<br>204.46<br>0.0901  | 429<br>429.3<br>224.6<br>0.090   | 469<br>8 469.17<br>4 244.23  | 509<br>507.73<br>263.17<br>0.0926  | 547<br>544.93<br>281.40<br>0.0936   | 584<br>580.<br>298.<br>0.09  | 30<br>621<br>66 614.8<br>86 315.51<br>47 0.0960  | 655<br>647.23<br>331.27<br>0.0973  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ $\mathfrak{I}^{(2)}$   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893   | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904   | 260<br>260.08<br>140.94<br>0.0884<br>0.0917  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934  | 346<br>346.52<br>183.74<br>0.0895<br>0.0954  | 388<br>388.45<br>204.46<br>0.0901<br>0.0977  | 429<br>429.3<br>224.6<br>0.090<br>0.100  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075  | 547<br>544.93<br>281.40<br>0.0936<br>0.1120   | 584<br>580.<br>298.<br>0.09<br>0.11  | 30<br>621<br>66 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $h\omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ 194 $Pb(b1)$ $\mathcal{J}_0$ Estimated Spin   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893   | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904   | 260<br>260.08<br>7 140.94<br>0 0.0884<br>0 0.0917  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934  | 346<br>346.52<br>183.74<br>0.0895<br>0.0954  | 388<br>388.45<br>204.46<br>0.0901<br>0.0977  | 429<br>429.3<br>224.6<br>0.090<br>0.100  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075  | 547<br>544.93<br>281.40<br>0.0936<br>0.1120   | 584<br>580.<br>298.<br>0.09<br>0.11  | 30<br>621<br>56 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\frac{E_{Cal}}{\hbar \omega}$ $\frac{J}{J}$ (1) $\frac{J}{J}$ (2) $\frac{194Pb(b1)}{J_0}$ Estimated Spin $\frac{E_{Cap}}{E_{Cal}}$   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88   | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904   | 260<br>260.08<br>140.94<br>0.0884<br>0.0917  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36   | 346<br>346.52<br>183.74<br>0.0895<br>0.0954<br>14<br>1298<br>299.96  | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52   | 429<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31  | 584<br>580.<br>298.<br>3 0.09<br>0 0.11<br>26<br>533<br>1 528.   | 30<br>621<br>66 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $h\omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ $\mathcal{J}^{(2)}$ $\mathcal{J}^{(2)}$ $\mathcal{J}_{0}$ Estimated Spin $E_{exp}$ $E_{cal}$  | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88<br>73.64  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>7 213.88<br>117.81   | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33   | 346<br>346.52<br>183.74<br>0.0895<br>0.0954<br>0.0954<br>14<br>1298<br>299.96<br>160.37  | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85   | 18<br>380<br>381.8<br>200.7  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.67  | 584<br>580.<br>580.<br>598.<br>60.09<br>0.11<br>26<br>533<br>528.<br>7272.   | 30<br>621<br>56 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49<br>22 287.74  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ $\mathfrak{I}^{94} p_b(b1)$ $\mathcal{J}_0$ $Estimated Spin$ $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$  | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884  | 260<br>260.08<br>7140.94<br>0 0.0884<br>1 0.0917<br>10<br>213<br>7 213.88<br>117.81<br>0 0.0888  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894   | 346<br>346.52<br>183.74<br>0.0895<br>0.0954<br>14<br>298<br>299.96<br>160.37<br>0.0900   | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85<br>0.0908   | 18<br>380<br>381.8<br>200.7<br>0.091   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.67  | 584<br>580, 298, 30, 099<br>0.11<br>26<br>533<br>528, 7272, 10, 099  | 30<br>621<br>56 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49<br>22 287.74<br>85 0.0981   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>603<br>590.48  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$ $\mathcal{J}^{(2)}$ $\mathcal{J}_{0}$ $\mathcal{J}_{0}$ Estimated Spin $E_{exp}$ $E_{cal}$ $\hbar \omega$ $\mathcal{J}^{(1)}$ $\mathcal{J}^{(2)}$  | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884  | 260<br>260.08<br>7140.94<br>0 0.0884<br>1 0.0917<br>10<br>213<br>7 213.88<br>117.81<br>0 0.0888  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894   | 346<br>346.52<br>183.74<br>0.0895<br>0.0954<br>14<br>298<br>299.96<br>160.37<br>0.0900   | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85<br>0.0908   | 18<br>380<br>381.8<br>200.7<br>0.091   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.67  | 584<br>580, 298, 30, 099<br>0.11<br>26<br>533<br>528, 7272, 10, 099  | 30<br>621<br>56 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49<br>22 287.74<br>85 0.0981   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>603<br>590.48  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\frac{E_{cal}}{\hbar \omega}$ $\frac{J}{J}$ $\frac{J}{J}$ $\frac{J}{J}$ $\frac{J}{J}$ $\frac{J}{J}$ Estimated Spin $\frac{E_{exp}}{E_{cal}}$ $\frac{E_{exp}}{\hbar \omega}$ $\frac{J}{J}$ $\frac{J}{J}$ $\frac{J}{J}$  | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884  | 260<br>260.08<br>7140.94<br>0 0.0884<br>1 0.0917<br>10<br>213<br>7 213.88<br>117.81<br>0 0.0888  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894   | 346<br>346.52<br>183.74<br>0.0895<br>0.0954<br>14<br>298<br>299.96<br>160.37<br>0.0900   | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85<br>0.0908   | 18<br>380<br>381.8<br>200.7<br>0.091   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.67  | 584<br>580, 298, 30, 099<br>0.11<br>26<br>533<br>528, 7272, 10, 099  | 30<br>621<br>56 614.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49<br>22 287.74<br>85 0.0981   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>603<br>590.48  | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\begin{split} &\frac{E_{col}}{\hbar\omega} \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) \\ &\frac{194p_b(b1)}{J_0} \\ &\frac{E_{extimated Spin}}{E_{ext}} \\ &\frac{E_{col}}{\hbar\omega} \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) \\ &\frac{192Hg(b1)}{J_0} \\ &\frac{J}{E_{extimated Spin}} \end{split}$   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>124.88<br>73.64<br>0.0881<br>0.0893   | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939   | 346 346.52 346.5 | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85<br>0.0908<br>0.0991   | 18<br>380<br>381.8<br>20.091<br>0.102  | 469<br>469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.61<br>0.0951<br>0.1174  | 584<br>580, 298, 30,09<br>0,11<br>26<br>533<br>1,528, 7,272, 10,09<br>1,012  | 30<br>621<br>56 644.8<br>86 315.51<br>47 0.0960<br>72 0.1233<br>28<br>568<br>38 560.49<br>22 287.74<br>85 0.0981<br>46 0.1334  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\frac{E_{cal}}{h\omega}$ $\frac{1}{\mathcal{J}^{(1)}}$ $\frac{1}{\mathcal{J}^{(2)}}$ $\frac{1}{\mathcal{J}^{(2)}}$ [194 $pb(b1)$ $\frac{1}{\mathcal{J}_0}$ Estimated Spin $\frac{E_{exp}}{h\omega}$ $\frac{1}{\mathcal{J}^{(1)}}$ $\frac{1}{\mathcal{J}^{(2)}}$ [192 $Hg(b1)$ $\frac{1}{\mathcal{J}_0}$ Estimated Spin $\frac{E_{exp}}{E_{exp}}$   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881<br>0.0881<br>0.0877  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>7213.88<br>117.81<br>0.0888<br>0.0920  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939   | 346 3<br>346 52 3<br>346 52 3<br>183.74 0<br>0.0895 0<br>0.0954 0<br>14<br>298 299.96 3<br>160.37 0<br>0.0900 0<br>0.0903 0  | 388<br>388.45<br>204.46<br>0.0901<br>0.0977<br>16<br>340<br>341.52<br>180.85<br>0.0908<br>0.0991   | 429<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.091<br>0.102   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115   | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.61<br>0.0951<br>0.1174  | 584<br>580,0<br>298,0<br>0,09<br>0,11<br>26<br>533<br>528,7<br>272,1<br>0,09<br>1,012  | 30<br>614.8<br>86 315.51<br>47 0.0966<br>72 0.1233<br>28<br>568<br>568<br>568,<br>568,<br>60.45<br>2 287.74<br>85 0.0981<br>46 0.1334  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\begin{split} &\frac{E_{col}}{\hbar\omega} \\ &\frac{1}{\mathcal{J}^{(1)}} \\ &\frac{1}{\mathcal{J}^{(2)}} \\ &\frac{194}{\mathcal{D}_0} \\ &\text{Estimated Spin} \\ &\frac{E_{exp}}{\hbar\omega} \\ &\frac{1}{\mathcal{J}^{(1)}} \\ &\frac{1}{\mathcal{J}^{(2)}} \\ &\frac{192}{\mathcal{H}g(b1)} \\ &\frac{1}{\mathcal{J}_0} \\ &\frac{1}{\mathcal{E}_{exp}} \\ &\frac{E_{exp}}{\mathcal{E}_{exp}} \end{split}$   | 8<br>171<br>170,99<br>96,70<br>0,0877<br>0,0893<br>0,0877<br>6<br>125<br>124,88<br>73,64<br>0,0881<br>0,0893<br>0,0877<br>10<br>214,59  | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920   | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>256<br>139.33<br>0.0894<br>0.0939  | 346 346.52 346.5 | 388<br>388,45<br>204,46<br>0.0901<br>0.0977<br>16<br>340<br>341,52<br>180,85<br>0.0991   | 18<br>380<br>381.8<br>20.091<br>0.1002   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>26<br>532<br>539.12  | 547<br>544.93<br>281.40<br>0.0936<br>0.1120<br>24<br>496<br>494.31<br>255.61<br>0.0951<br>0.1174  | 584<br>580,0<br>298,0<br>0,09<br>0,11<br>26<br>533<br>528,0<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,009<br>1,00   | 30<br>66 614.8<br>86 614.8<br>86 614.8<br>87 0.096<br>72 0.1233<br>28 568<br>38 560.4<br>22 287.74<br>85 0.098<br>46 0.1334  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39                          | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(3)$ $\mathcal{J}_0$ Estimated Spin $E_{egp}$ $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ $\mathcal{J}(2)$ 192 $Hg(b1)$ $\mathcal{J}_0$ Estimated Spin $E_{egp}$ $E_{cal}$ $E_{egp}$ $E_{cal}$ $E_{egp}$ $E_{cal}$ $E_{egp}$ $E_{cal}$ $E_{egp}$ $E_{cal}$ $E_{cal}$ $E_{cal}$ $E_{cal}$  | 8<br>171<br>170,99<br>96,70<br>0,0877<br>0,0893<br>0,0877<br>6<br>125<br>124,88<br>73,64<br>0,0881<br>0,0893<br>0,0877<br>10<br>214<br>213,59<br>213,79<br>211,75   | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920   | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939   | 346 346 346 52 52 346 52 52 52 52 52 52 52 52 52 52 52 52 52                           | 388<br>388,45<br>204,46<br>0.0901<br>0.0977<br>16<br>340<br>341,52<br>341,52<br>0.0991<br>20<br>421<br>424,88<br>222,28  | 18<br>380<br>381.8<br>20.102<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.102  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>539.12<br>278.39  | 547<br>544,93<br>281,40<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,61<br>0.0951<br>0.1174<br>28<br>567<br>574,43<br>295,64   | 584<br>8 580.0<br>9 298.0<br>0 0.09<br>0 0.11<br>26<br>533<br>1 528.7<br>7 272.1<br>0 0.09<br>1 0.12<br>30<br>602<br>3 608.1<br>3 12.1   | 30<br>60<br>614.8<br>80<br>315.51<br>47<br>0.0960<br>72<br>0.1233<br>28<br>568<br>38 560.48<br>50.0981<br>46 0.1334<br>32<br>635<br>15 640.17<br>83 327.68   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\begin{split} &\frac{E_{cod}}{\hbar\omega} \\ &\frac{1}{\hbar\omega} \\ &\frac{1}{\mathcal{J}^{(1)}} \\ &\frac{1}{\mathcal{J}^{(2)}} \\ &\frac{194}{\hbar_0} \\ &\frac{194}{\hbar_0} \\ &\frac{194}{\hbar_0} \\ &\frac{194}{\hbar_0} \\ &\frac{192}{\hbar_0} \\ &\frac{192}$   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0893<br>0.0877<br>6<br>124.88<br>73.64<br>0.0881<br>0.0887<br>10<br>214<br>213.59<br>0.0877<br>10  | 10<br>216<br>215.81<br>118.92<br>0.0880<br>0.0904<br>8<br>8<br>170<br>169.62<br>95.89<br>0.0884<br>0.0905   | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888; 0.0920<br>14<br>300<br>300.55<br>160.87<br>0.0898  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939   | 346 346 346.52 3 | 388<br>388,45<br>204,46<br>0,0901<br>0,0907<br>16<br>340<br>341,52<br>180,85<br>0,0991<br>20<br>121<br>124,88<br>222,28  | 429<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.091<br>0.102<br>22<br>459<br>464.2<br>241.6<br>0.092   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>539.12<br>278.39<br>0.0946  | 547<br>544,93<br>281,4(<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,67<br>0.0951<br>0.1174<br>28<br>567<br>574,43<br>295,64<br>0.0958   | 584<br>580,099<br>50,099<br>51,009<br>526<br>533<br>528,1<br>527,1<br>602<br>602<br>602<br>603<br>604<br>608<br>608<br>608<br>608<br>609<br>609<br>609<br>609<br>609<br>609<br>609<br>609  | 30<br>621<br>66 614.8<br>86 315.51<br>70 0.1233<br>28 28 28 28 28 28 27 28 38 500.48<br>28 60.48<br>28 60.48<br>29 63 60.48<br>32 63 63 640.11<br>32 63 63 63 640.11   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39                          | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $\frac{E_{coal}}{h\omega}$ $\frac{1}{M}$ $\frac{1}{M$   | 8<br>171<br>170,99<br>96,70<br>0,0877<br>0,0893<br>0,0877<br>6<br>125<br>124,88<br>73,64<br>0,0881<br>0,0893<br>0,0877<br>10<br>214<br>213,59<br>117,75<br>0,0889<br>0,0913   | 10<br>216<br>215.81<br>118.92<br>0.0880<br>0.0904<br>8<br>8<br>170<br>169.62<br>95.89<br>0.0884<br>0.0905   | 260<br>260.084<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920<br>14<br>300<br>300.55<br>160.87<br>0.0898   | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939   | 346 346 346.52 3 | 388<br>388,45<br>204,46<br>0,0901<br>0,0907<br>16<br>340<br>341,52<br>180,85<br>0,0991<br>20<br>121<br>124,88<br>222,28  | 429<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.091<br>0.102<br>22<br>459<br>464.2<br>241.6<br>0.092   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>496<br>4 502.36<br>5 260.37<br>6 0.0936  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>539.12<br>278.39<br>0.0946  | 547<br>544,93<br>281,4(<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,67<br>0.0951<br>0.1174<br>28<br>567<br>574,43<br>295,64<br>0.0958   | 584<br>580,099<br>50,099<br>51,009<br>526<br>533<br>528,1<br>527,1<br>602<br>602<br>602<br>603<br>604<br>608<br>608<br>608<br>608<br>609<br>609<br>609<br>609<br>609<br>609<br>609<br>609  | 30<br>621<br>66 614.8<br>86 315.51<br>70 0.1233<br>28 28 28 28 28 28 27 28 38 500.48<br>28 60.48<br>28 60.48<br>29 63 60.48<br>32 63 63 640.11<br>32 63 63 63 640.11   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39                          | 689<br>677.85<br>346.09<br>0.0988               | 36<br>720<br>706.54                        |                         |                                      |                      |
| $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ [194 $P_{b}(b_{1})$ $\mathcal{J}_{0}$ Estimated Spin $E_{exp}$ $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ [192 $H_{g}(b_{1})$ $\mathcal{J}_{0}$ Estimated Spin $E_{exp}$ $E_{cal}$ $\mathcal{J}_{0}$ Estimated Spin $E_{exp}$ $E_{cal}$ $\mathcal{J}_{0}$ 1192 $\mathcal{J}_{0}$ 1193 $\mathcal{J}_{0}$ 1194 $\mathcal{J}_{0}$ 1195 $\mathcal{J}_{0}$ 1195 $\mathcal{J}_{0}$ 1196 $\mathcal{J}_{0}$ 1196 $\mathcal{J}_{0}$  | 8<br>171<br>170,99<br>96,70<br>0.0877<br>0.0893<br>0.0877<br>6<br>125<br>124,88<br>73.64<br>0.0893<br>0.0877<br>10<br>214<br>213,59<br>117,75<br>0.0889<br>0.0913   | 10<br>216<br>215.81<br>118.92<br>0.0880<br>0.0904<br>8<br>8<br>170<br>169.62<br>95.89<br>0.0884<br>0.0905   | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920<br>14<br>300<br>300.55<br>160.87<br>0.0898  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0964  | 346   346.52 | 388<br>388,45<br>204,46<br>0,0901<br>0,0977<br>16<br>340<br>341,52<br>180,85<br>0,0908<br>0,0991<br>20<br>121<br>124,88<br>222,28<br>0,0918<br>0,1016  | 18<br>380<br>381.8<br>200.7<br>0.091<br>0.102<br>22<br>459<br>464.2<br>241.6<br>0.092<br>0.104   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>496<br>4 502.36<br>5 260.37<br>6 0.0936<br>9 0.1088  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>539.12<br>278.39<br>0.0946<br>0.1133  | 547<br>544,93<br>281,4(<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,67<br>0.0951<br>0.1174<br>28<br>567<br>574,43<br>295,64<br>0.0958   | 584<br>580,099<br>50,099<br>51,009<br>526<br>533<br>528,1<br>527,1<br>602<br>602<br>602<br>603<br>604<br>608<br>608<br>608<br>608<br>609<br>609<br>609<br>609<br>609<br>609<br>609<br>609  | 30<br>621<br>66 614.8<br>86 315.51<br>70 0.1233<br>28 28 28 28 28 28 27 28 38 500.48<br>28 60.48<br>28 60.48<br>29 63 60.48<br>32 63 63 640.11<br>32 63 63 63 640.11   | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48   | 689 7<br>677.85 7<br>346.09<br>0.0988<br>0.1395 | 36<br>720<br>706.54                        | 37.5                    | 29.5                                 |                      |
| $\begin{split} &\frac{E_{col}}{h\omega} \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) \\ &\frac{J}{J}(2) \\ &\frac{J}{J}(2) \\ &\frac{194}{J}pb(b1) \\ &\frac{J}{J}_{0} \\ &\frac{Eexp}{\hbar\omega} \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) \\ &\frac{Eexp}{\hbar\omega} \\ &\frac{Eexp}{\hbar\omega} \\ &\frac{Eexp}{\hbar\omega} \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) \\ &\frac{J}{J}(1) \\ &\frac{J}{J}(2) $   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.08877<br>6<br>125<br>124.88<br>73.64<br>0.0893<br>0.0893<br>0.0897<br>10<br>214<br>213.59<br>117.75<br>0.0889<br>0.0913  | 10<br>216<br>215.81<br>118.97<br>0.0880<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905<br>12<br>258<br>257.4<br>139.45<br>0.0894<br>0.0927  | 260<br>260.08<br>140.94<br>0.0884<br>0.0917<br>10<br>213<br>213.88<br>117.81<br>0.0888<br>0.0920<br>14<br>300.55<br>160.87<br>0.0898<br>0.0944   | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0904<br>0.0964  | 346   346.52 | 388<br>388,45<br>204,46<br>0,0901<br>0,0977<br>16<br>340<br>341,52<br>180,85<br>0,0908<br>0,0991<br>20<br>121<br>124,88<br>222,28<br>0,1016  | 18<br>380<br>381<br>381<br>0.091<br>0.102<br>18<br>220.7<br>0.091<br>0.102<br>22<br>241.6<br>0.092<br>0.104  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>4 502.36<br>5 260.37<br>6 0.0936<br>9 0.1088<br>21.5   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>2238.19<br>0.0938<br>0.1115<br>26<br>532<br>278.39<br>0.0946<br>0.1133   | 547<br>544, 95<br>281, 40<br>0,0936<br>0,1120<br>24<br>496<br>494, 31<br>255, 61<br>0,0951<br>0,1174<br>28<br>567<br>574, 43<br>295, 64<br>0,0958<br>0,1186<br>255, 505   | 584<br>580, 298, 30,09<br>0,011<br>26<br>533<br>528, 528, 60,09<br>0,012<br>30<br>602<br>602<br>608, 312, 312, 30<br>601<br>602<br>603<br>604<br>605<br>607<br>608, 30,09<br>607<br>608, 30,09<br>609, 609, 609, 609, 609, 609, 609, 609,  | 30<br>621<br>96 614.8<br>86 315.51<br>70 0.098<br>28<br>588<br>38 560.45<br>22 287.74<br>85 0.0981<br>46 0.1334<br>32<br>63<br>65<br>640.17<br>8 327.64<br>9 0.1324  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>434<br>668<br>670.39                         | 689 7<br>677.85 1<br>346.09<br>0.0988<br>0.1395 | 35.5                                       | 37.5<br>713             | 746                                  | 41.5                 |
| $\begin{split} &\frac{E_{coal}}{h\omega} \\ &\frac{h\omega}{\mathcal{J}(1)} \\ &\frac{\mathcal{J}(2)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(2)}{\mathcal{J}_0} \\ &\frac{194P_{b}(b1)}{\mathcal{J}_0} \\ &\frac{E_{sxp}}{E_{coal}} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{$                              | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881<br>0.0893<br>0.0877<br>10<br>214<br>213.59<br>117.75<br>0.0889<br>0.0913   | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905<br>12<br>258<br>257.4<br>139.49<br>0.0894<br>0.0927  | 260 260 1260 140.94 10.0884 10.0917 10 213.88 117.81 0.0888 10.0920 14 300 5 160.87 10.0944 11.5 229 129.29  | 303<br>303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>256<br>139.33<br>0.0894<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0964<br>0.0964  | 346   346   346   52   183.74   20.0895   0.0954   0.0954   0.0954   0.0954   0.0963   0.0963   0.0963   0.0963   0.0963   0.0968   0.0988 | 388<br>388,45<br>204,46<br>0,0901<br>0,0977<br>16<br>340<br>341,52<br>180,85<br>0,0991<br>20<br>121<br>124,88<br>20,0918<br>0,1016   | 429<br>429,3<br>224,6<br>0.090<br>0.100<br>18<br>380<br>381,8<br>200,7<br>0.091<br>0.102<br>22<br>459<br>464,2<br>241,6<br>0.092<br>0.104  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>20<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>4 502.36<br>5 260.37<br>6 0.0936<br>9 0.   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458.45<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>539.12<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91   | 547<br>544,92<br>581,40<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,61<br>0.0951<br>0.1174<br>28<br>567<br>574,43<br>295,64<br>0.0958<br>0.1186<br>25,5<br>505<br>511,02  | 584<br>580, 0.09<br>0.011<br>26<br>528, 272, 0.09<br>0.012<br>30<br>602<br>0.02<br>0.02<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0.03<br>0 | 30<br>30<br>621<br>66 614.8<br>66 315.51<br>72 0.1233<br>28<br>568<br>38 560.4<br>39 560<br>63 50.0981<br>46 0.1334<br>32 635<br>15 640.1134<br>0.0984<br>0.1324<br>0.1324<br>29.5<br>577<br>65 587.765  | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39                          | 689 7<br>689 7<br>346.09<br>0.0988<br>0.1395    | 35.5<br>379<br>398.60                      | 734.2                   | 746<br>5 769.1                       | 777<br>9 803.37      |
| $\begin{split} &\frac{E_{coal}}{h\omega} \\ &\frac{h\omega}{\mathcal{J}(1)} \\ &\frac{\mathcal{J}(2)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(2)}{\mathcal{J}_0} \\ &\frac{194P_{b}(b1)}{\mathcal{J}_0} \\ &\frac{E_{sxp}}{E_{coal}} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}_0} \\ &\frac{\mathcal{J}(1)}{$                              | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0893<br>0.0893<br>0.0897<br>10<br>214<br>213.59<br>0.0955<br>7.5<br>146<br>146.32<br>83.55  | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>170<br>169.67<br>95.89<br>0.0884<br>0.0905<br>12<br>258<br>0.0894<br>0.0927   | 260 0 260 0 140.94 10.0884 10.0917 10 213 213.88 117.81 10.0920 14 14 10.0920 14 14 15 10.0898 10.0898 10.0898 10.0898 10.0920 11.5 229 1229.29 1224.94  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0994<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0904<br>0.0964  | 346   346   346.52   183.74   183.74   193.74    | 188<br>188<br>188<br>188<br>188<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198<br>198                                      | 429<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.091<br>0.102<br>22<br>459<br>464.2<br>241.6<br>0.092<br>0.104<br>19.5<br>390<br>392.4<br>206.1   | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>496<br>496<br>6 0.0936<br>6 0.0936<br>9 0.1088<br>21.5<br>429<br>0 432.36<br>9 0 213.36  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458.4<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91<br>245.73   | 547<br>544,93<br>541,40<br>0.0936<br>0.1120<br>24<br>496<br>494,31<br>255,67<br>0.0951<br>0.1174<br>28<br>0.0958<br>0.1186<br>25,5<br>505<br>511,02<br>265,11   | 584.<br>580.<br>9 298.<br>9 0.099<br>9 0.11<br>26<br>533<br>528.<br>9 272.<br>0.09<br>1 0.12<br>30<br>602<br>1 608.<br>30.<br>9 0.12<br>2 1 508.<br>3  | 30<br>30<br>621<br>66 614.8<br>67 315.5 614.8<br>47 0.0966<br>72 0.1233<br>28<br>28<br>38 560.4<br>46 0.1334<br>46 0.1334<br>32<br>635 16 640.13<br>640.1334<br>640.1334<br>640.1334<br>640.1334<br>650.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.0984<br>660.09 | 655<br>647.23<br>331.27<br>0.0973<br>0.1306<br>30<br>603<br>590.48<br>668<br>670.39                                | 689 7<br>677.85 7<br>346.09<br>0.0988<br>0.1395 | 35.5<br>379<br>398.60<br>358.21            | 734.2<br>375.8          | 746<br>5 769.1<br>6 393.1            | 777<br>9 803.37<br>4 |
| $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ [194 $Pb(b1)$ $\mathcal{J}_0$ Estimated Spin $E_{egp}$ $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ [192 $Hg(b1)$ $\mathcal{J}_0$ Estimated Spin $E_{egp}$ $E_{cal}$ $h\omega$ $\mathcal{J}(2)$ [192 $Hg(b1)$ $\mathcal{J}_0$ Estimated Spin $E_{egp}$ $E_{cal}$ $h\omega$ $\mathcal{J}(1)$ $\mathcal{J}(2)$ [195 $\mathcal{J}(2)$ [195 $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ Estimated Spin $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(2)$ $\mathcal{J}(3)$ $\mathcal{J}($   | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881<br>0.0881<br>0.0881<br>0.0893<br>0.0877<br>10<br>214<br>213.59<br>0.0893<br>0.0955<br>7.5<br>6<br>146.32<br>83.55<br>0.0955  | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>8<br>170<br>169.67<br>95.89<br>0.0984<br>0.0905<br>12<br>258<br>257.4<br>139.49<br>0.0984<br>0.0927   | 260 08 140.94 10.081 10 213 88 117.81 0.0820 144 300 55 160.87 11.5 229 229 124.94 0.0950 11.5 229 124.94 0.0950 10.0050 10.00 | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0964<br>0.0964<br>13.5<br>270   | 346   346   346   52   183.74   183.74   19.0895   0.0954   14   1298   160.37   0.0900   0.0963   18   382   18   384.41   19.0895   15.5   3311   3111   3111   42   165.87   0.0963   165.87   0.0963   165.87   165.87   165.8 | 1888.45<br>188.45<br>188.45<br>190.446<br>100.406<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>1 | 429.3<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.102<br>22<br>4459<br>0.091<br>0.102<br>21<br>464.2<br>241.6<br>0.092<br>0.104<br>19.5<br>390<br>392.4<br>19.5<br>0.090<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5     | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>496<br>4 502.36<br>5 260.37<br>6 0.0936<br>9 0.1088<br>21.5<br>429<br>0 0.936<br>0 0 0.936<br>0 0 0.936<br>0 0 0.936<br>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91<br>245.73<br>0.0975  | 547<br>544.95<br>241.46<br>0.0936<br>0.1126<br>24<br>496<br>494.31<br>255.67<br>0.0955<br>0.0955<br>0.1186<br>255.55<br>511.07<br>209.77<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78      | 584<br>580<br>580<br>580<br>580<br>580<br>580<br>580<br>580  | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $\begin{split} &\frac{E_{col}}{\hbar\omega} \\ &\frac{1}{M} \\ $  | 8<br>171<br>170.99<br>96.70<br>0.0877<br>0.0877<br>6<br>125<br>124.88<br>73.64<br>0.0881<br>0.0881<br>0.0881<br>0.0893<br>0.0877<br>10<br>214<br>213.59<br>0.0893<br>0.0955<br>7.5<br>6<br>146.32<br>83.55<br>0.0955  | 10<br>216<br>215.81<br>118.97<br>0.0886<br>0.0904<br>8<br>8<br>170<br>169.67<br>95.89<br>0.0984<br>0.0905<br>12<br>258<br>257.4<br>139.49<br>0.0984<br>0.0927   | 260 08 140.94 10.081 10 213 88 117.81 0.0820 144 300 55 160.87 11.5 229 229 124.94 0.0950 11.5 229 124.94 0.0950 10.0050 10.00 | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0939<br>16<br>341<br>342.93<br>181.83<br>0.0964<br>0.0964<br>13.5<br>270   | 346   346   346   52   183.74   183.74   19.0895   0.0954   14   1298   160.37   0.0900   0.0963   18   382   18   384.41   19.0895   15.5   3311   3111   3111   42   165.87   0.0963   165.87   0.0963   165.87   165.87   165.8 | 1888.45<br>188.45<br>188.45<br>190.446<br>100.406<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>101.00991<br>1 | 429.3<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.102<br>22<br>4459<br>0.091<br>0.102<br>21<br>464.2<br>241.6<br>0.092<br>0.104<br>19.5<br>390<br>392.4<br>19.5<br>0.090<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5     | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>496<br>496<br>6 0.0936<br>6 0.0936<br>9 0.1088<br>21.5<br>429<br>0 432.36<br>9 0 213.36  | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>532<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91<br>245.73<br>0.0975  | 547<br>544.95<br>241.46<br>0.0936<br>0.1126<br>24<br>496<br>494.31<br>255.67<br>0.0955<br>0.0955<br>0.1186<br>255.55<br>511.07<br>209.77<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78<br>209.78      | 584<br>580<br>580<br>580<br>580<br>580<br>580<br>580<br>580  | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $E_{cal}$ $hω$ $J(1)$ $J(2)$ $J(2)$ [194 $Pb(b1)$ $J_0$ Estimated Spin $E_{exp}$ $E_{cal}$ $hω$ $J(1)$ $J_0$ Estimated Spin $E_{exp}$ $E_{cal}$ $hω$ $J(2)$ [20] Estimated Spin $E_{exp}$ $E_{cal}$ $hω$ $J(1)$ $J(1)$ $J(2)$ $J(2)$ Estimated Spin $E_{exp}$ $E_{cal}$ $hω$ $J(1)$ $J(2)$ Estimated Spin $E_{exp}$ $E_{cal}$ $hω$ $J(1)$ $J(2)$ $J(1)$ $J(2)$ $J(3)$  | 8<br>171<br>170.996.70<br>0.0877<br>0.0877<br>0.0878<br>6<br>124.88<br>0.0857<br>124.88<br>0.0851<br>10<br>10<br>214<br>10<br>0.0851<br>117.75<br>0.0853<br>117.75<br>0.0853<br>114.95<br>0.0958<br>146.95<br>0.0958<br>0.0958<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.0969<br>0.096   | 10<br>215.837<br>0.0886<br>0.0904<br>8<br>170<br>0.0886<br>0.0905<br>0.0888<br>0.0905<br>12<br>258<br>0.0894<br>0.0927<br>9.5<br>188<br>187.85<br>10.436<br>0.0966  | 260 0 260 0 100 0  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939<br>16<br>341.83<br>0.0904<br>0.0904<br>13.5<br>270.48<br>145.48<br>0.0901<br>0.0977   | 346 5 346 5 346 52 183.74 0.0895 (0.0954 (0.09 | 1888.45<br>1888.45<br>1888.45<br>1888.45<br>199.446<br>100.466<br>100.0997<br>100.0997<br>100.0997<br>100.09991<br>100.09991<br>100.09991<br>100.09991<br>100.09991<br>100.09992   | 429.3<br>429.3<br>429.3<br>0.090<br>0.100<br>118<br>380.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.8<br>381.   | 469<br>469<br>4144,23<br>4244,23<br>420<br>420<br>420<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>91420,91<br>914   | 509<br>507.73<br>263.17<br>0.0926<br>0.1075<br>22<br>24<br>458<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>539.12<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91<br>245.73<br>0.0975<br>0.0975  | 547<br>544.95<br>281.4(0.0936<br>0.012(24)<br>496.49(-13)<br>225.6(-10)<br>0.0951<br>0.0951<br>0.1186<br>25.5<br>511.02<br>0.0977<br>0.1035   | 584<br>580<br>580<br>580<br>580<br>580<br>580<br>580<br>580  | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $\begin{array}{l} E_{cal} \\ h\omega \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \mathcal{J}(2) \\ \end{array}$ $\begin{array}{l} 19^4 P_b(b1) \\ \mathcal{J}_0 \\ \text{Eatimated Spin} \\ E_{exp} \\ E_{cal} \\ h\omega \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \end{array}$ $\begin{array}{l} 19^2 H_g(b1) \\ \mathcal{J}_0 \\ \text{Estimated Spin} \\ E_{exp} \\ E_{cal} \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \end{array}$ $\begin{array}{l} 192 H_g(b1) \\ \mathcal{J}_0 \\ \text{Estimated Spin} \\ E_{exp} \\ \text{Eatimated Spin} \\ E_{exp} \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \end{array}$  | 8<br>171<br>170,996,70<br>0,0877<br>0,0893<br>125<br>124,88<br>124,88<br>0,0881<br>0,0881<br>117,75<br>117,75<br>0,0889<br>0,0913<br>0,0889<br>0,0955<br>7,5<br>146<br>146,92<br>0,0955<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0,0962<br>0  | 10<br>215.8 9<br>0.0886<br>0.0904<br>8<br>170<br>0.0886<br>0.0905<br>1169.67<br>258<br>0.0884<br>0.0905<br>12<br>258<br>257.4<br>0.0927<br>0.0894<br>0.0927<br>0.0905<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0.0906<br>0. | 260 0 260 0 100 0  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939<br>16<br>341<br>19<br>342.93<br>181.83<br>0.0904<br>0.0964<br>13.5<br>270<br>270.48<br>145.48<br>0.0961<br>0.0977               | 346 5 346.52 183.74 0 0.895 (0 0.0954 0 0.0954 0 0.0954 0 0.0963 0 0.0060 0 0.0060 0 0.0060 0 0.0060 0 0.0060 0 0.0060 0 | 1888.452.04.466.468.468.468.468.468.468.468.468.46   | 429.3<br>429.3<br>224.6<br>0.090.0<br>100.0<br>118.3<br>380.8<br>381.8<br>381.8<br>381.8<br>200.7<br>0.091.0<br>10.102.0<br>459.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>10.102.0<br>1   | 469<br>8 469.17<br>4 244.23<br>8 0.9916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>4 50<br>25<br>26<br>4 50<br>20<br>21.5<br>4 20<br>21.5<br>4 20<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5<br>21.5 | 509<br>507.73<br>203.17<br>0.0926<br>0.1075<br>22<br>4458.44<br>458.44<br>238.19<br>0.0938<br>0.1115<br>26<br>539.12<br>539.12<br>278.39<br>0.0946<br>0.1133<br>23.5<br>447<br>447.91<br>245.73<br>0.0975<br>0.0975<br>0.1023  | 547<br>544.95<br>544.95<br>0.0933<br>0.1126<br>24<br>496<br>24<br>496<br>0.0955<br>0.0175<br>28<br>567<br>74.45<br>295.66<br>0.0955<br>0.0955<br>0.0186<br>295.66<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955<br>0.0955 | 584<br>580<br>580<br>580<br>580<br>580<br>580<br>580<br>580  | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $\begin{array}{l} E_{cal} \\ h\omega \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \mathcal{J}(2) \\ \mathcal{J}(2) \\ \mathcal{J}_0 \\ \text{Estimated Spin} \\ E_{exp} \\ E_{cal} \\ \mathcal{J}(1) \\ \mathcal{J}(2) \\ \mathcal{J}_0 \\ \text{Insumated Spin} \\ E_{exp} \\ \mathcal{J}_0 \\ \mathcal{J}$ | 8<br>171<br>170<br>996.70<br>0.08777<br>0.0853<br>125<br>6<br>6<br>6<br>124.888<br>10.0851<br>10<br>10.0851<br>10<br>0.0851<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0.0853<br>10<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0<br>0 | 10   216   32   32   32   33   34   34   34   34  | 260 0 260 0 100 100 100 100 100 100 100 100 100  | 303<br>303.69<br>162.55<br>0.0889<br>0.0934<br>12<br>256<br>257.36<br>139.33<br>0.0894<br>0.0939<br>16<br>341<br>19<br>342.93<br>181.83<br>0.0904<br>0.0964<br>13.5<br>270<br>270.48<br>145.48<br>0.0961<br>0.0977               | 346 5 346 5 346.52 183.74 0 0.0895 0 0.0954 0 14 14 12 160.37 0 0.0963 0 0.0963 0 15.5 311 1.42 165.87 0 0.0963 0 0.0963 0 15.5 311 1.42 165.87 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0963 0 0.0964 0 0 | 1888.45<br>1888.45<br>1888.45<br>1888.45<br>199.446<br>100.466<br>100.0997<br>100.0997<br>100.0997<br>100.09991<br>100.09991<br>100.09991<br>100.09991<br>100.09991<br>100.09992   | 189 188 189 199 199 199 199 199 199 199  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>420<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>24<br>459.36<br>6 0.0936<br>9 0.1088<br>21.5<br>469<br>21.5<br>10.1011   | 509<br>507.73<br>203.17<br>203.17<br>203.17<br>21<br>22<br>22<br>458.44<br>458.458.44<br>458.458.40<br>0.0938<br>0.1115<br>26<br>27<br>28<br>29<br>29<br>20<br>20<br>21<br>21<br>22<br>23<br>23<br>24<br>25<br>27<br>27<br>28<br>29<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20<br>20  | 547<br>544.92<br>543.92<br>544.92<br>6.0.9936<br>6.1126<br>24<br>496<br>6.0.9951<br>6.0.9951<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566  | 584<br>580.09<br>598.3<br>599.3<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500   | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $\begin{split} &\frac{E_{cal}}{h\omega} \\ &\frac{J(1)}{J(2)} \\ &\frac{J(2)}{J(2)} \\ &\frac{J(2)}{J_0} \\ &\frac{Eatimated Spin}{E_{cal}} \\ &\frac{J(1)}{J(2)} \\ &\frac{J(2)}{J(2)} \\ &J(2$  | 8<br>171<br>170,996,70<br>0.0877<br>0.0857<br>0.0877<br>0.0853<br>125<br>126<br>127<br>124,88<br>73,64<br>10,0857<br>10<br>214,213,59<br>0.0877<br>10<br>214,75<br>0.0889<br>0.0958<br>3,55<br>146<br>0.0958<br>3,55<br>0.0969<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.0968<br>0.096   | 10<br>215.8<br>118.9<br>0.0886<br>0.090.4<br>8<br>170<br>0.088.6<br>0.090.5<br>12<br>258.2<br>257.4<br>0.089.2<br>188.7<br>187.8<br>19.5<br>19.5<br>0.090.2<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5   | 260 0.0 140,94 100,00 110,00 110,00 110,00 110,00 110,00 117,00 110,00 1 | 303<br>303.69<br>162.55<br>0.0889<br>0.0889<br>0.0934<br>12<br>256<br>256<br>139.33<br>0.0994<br>0.0939<br>16<br>342.93<br>342.93<br>181.83<br>0.0904<br>0.0904<br>0.0904<br>13.5<br>270<br>270.48<br>145.48<br>0.0901<br>0.0977 | 346 52 188.74 18 | 188 188 185 188 188 188 188 188 188 188  | 129<br>429.3<br>224.6<br>0.090<br>0.100<br>18<br>380<br>381.8<br>200.7<br>0.091<br>241.6<br>0.092<br>0.104<br>19.5<br>390<br>19.5<br>431<br>430.9<br>19.5<br>431<br>430.9<br>19.5  | 469<br>8 469.17<br>4 244.23<br>8 0.0916<br>5 0.1037<br>20<br>9 420.91<br>0 219.84<br>7 0.0927<br>5 0.1066<br>44<br>409<br>4 5 260.37<br>6 0.0936<br>0 0.1088<br>21.5<br>429<br>429<br>430.91<br>6 0.0936<br>0 0.0936<br>0 0.0936<br>1  | 509<br>507.73<br>203.17<br>0.0926<br>0.1075<br>22<br>468<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46<br>468.46 | 547<br>544.92<br>543.92<br>544.92<br>6.0.9936<br>6.1126<br>24<br>496<br>6.0.9951<br>6.0.9951<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566  | 584<br>580.09<br>598.3<br>599.3<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500   | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |
| $\begin{split} &\frac{E_{cal}}{h\omega} \\ &\frac{h\omega}{\mathcal{J}(1)} \\ &\frac{\mathcal{J}(2)}{\mathcal{J}(2)} \\ &\frac{194}{f_0} \\ &\frac{194}{f_0} \\ &\frac{194}{f_0} \\ &\frac{Eatimated}{h\omega} \\ &\frac{\mathcal{J}(1)}{\mathcal{J}(2)} \\ &\frac{192}{f_0} \\ &19$  | 8<br>171<br>170,996,70<br>0.0877<br>0.0893<br>0.0877<br>125<br>0.0887<br>124,888<br>0.0881<br>104,0881<br>104,0881<br>104,0881<br>104,0881<br>104,0881<br>104,0881<br>104,0957<br>105,091<br>106,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091<br>107,091  | 10<br>215.8 2<br>118.9 2<br>0.088(3)<br>8<br>170<br>0.088(3)<br>170<br>0.088(3)<br>0.090(2)<br>1258<br>139.45<br>0.090(2)<br>1257.4<br>139.45<br>0.090(2)<br>158.0<br>169.0<br>170<br>0.090(2)<br>170<br>0.090(2)<br>170<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090(2)<br>0.090   | 260 08 140.94 0 0.0917 10 0.0884 117.81 0.0920 117.81 10 0.0920 117.81 0.0920 117.81 0.0888 0.0944 117.81 11.5 0.0920 0.0971 11.5 0.0920 0.0920 0.0971 11.5 0.0920 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0 | 303<br>303.69<br>162.55<br>0.0889<br>0.0889<br>0.0934<br>12<br>256<br>256<br>139.33<br>0.0994<br>0.0939<br>16<br>342.93<br>342.93<br>181.83<br>0.0904<br>0.0904<br>0.0904<br>13.5<br>270<br>270.48<br>145.48<br>0.0901<br>0.0977 | 346 . 52 . 34 . 34 . 34 . 34 . 34 . 34 . 34 . 3  | 188 188 185 201.46 201.   | 18<br>18<br>18<br>380<br>381.8<br>224.6<br>0.090<br>0.100<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19.5<br>19. | 469<br>469<br>414,23<br>424,23<br>420<br>50,1037<br>20<br>420<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91<br>9120,91  | 509<br>507.73<br>203.17<br>0.0926<br>0.1075<br>22<br>458<br>458.44<br>458.43<br>328.19<br>0.0938<br>0.1115<br>26<br>278.39<br>0.0946<br>0.1133<br>23.5<br>467<br>471.91<br>471.91<br>23.5<br>507<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0036<br>20.0   | 547<br>544.92<br>543.92<br>544.92<br>6.0.9936<br>6.1126<br>24<br>496<br>6.0.9951<br>6.0.9951<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9556<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566<br>6.0.9566  | 584<br>580.09<br>598.3<br>599.3<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500.09<br>500   | 30<br>30<br>621<br>66 614.8<br>67 315.5 63<br>47 0.0966<br>72 0.1233<br>28<br>28<br>508<br>38 560.4<br>508<br>30 0.981<br>60 0.1334<br>61 0.1334<br>90 0.1334<br>90 0.1324<br>90                                  | 655<br>647.23<br>331.27<br>0.1306<br>0.1306<br>30<br>603<br>590.48<br>34<br>668<br>670.39<br>31.5<br>612<br>321.90 | 689 7<br>677.85<br>346.09<br>0.0988<br>0.1395   | 35.5<br>379<br>388.60<br>358.61<br>35.1002 | 734.2<br>375.8<br>0.100 | 746<br>5 769.1<br>6 393.1<br>8 0.104 | 777<br>9 803.37<br>4 |

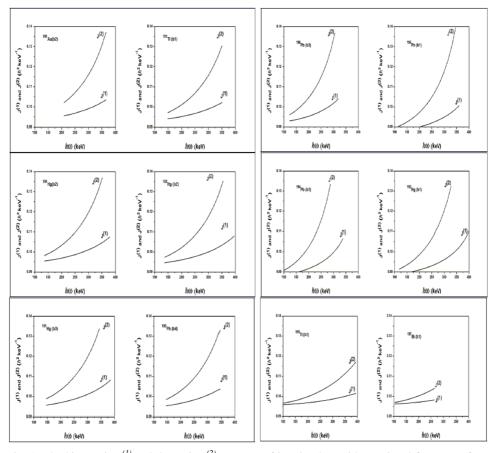


Fig. 1. The kinematic  $J^{(I)}$  and dynamic  $J^{(2)}$  moment of inertia plots with rotational frequency for 6 pairs of SDIBs.  $J^{(2)}$  is significantly higher than  $J^{(I)}$  in all the cases.

## 3. Results

In this section we studied 16 pairs of Super-Deformed Identical Bands (SDIBs) in A = 190 mass region. Firstly the band head spin and level spins of all the available SD bands is obtained by using the modified VMI model. The transition energies, band head moment of inertia for all the pairs have been calculated and compared with the experimentally available data using modified VMI model and data for 6 pairs are presented in Table 1 which are not quoted earlier in literature. The band-head moment of inertia ( $J_0$ ) parameter is determined by fitting experimentally known transition energies using the Best Fit Method (BFM). A good agreement between the moment of inertia and the energies between two isotopes confirm these as identical bands which are investigated and shown in Table 1. The band-head moment of inertia ( $J_0$ ), calculated and experimental transition energies, rotational frequencies, kinematic  $J^{(1)}$  and dynamic  $J^{(2)}$  moment of inertia along with spin for the six pairs of IBs are given in Table 1. To illustrate the quantitative

agreement between the two isotopes of identical bands, we plotted in Fig. 1 the kinematic  $J^{(1)}$  and dynamic  $J^{(2)}$  moments of inertia with rotational frequencies for 6 pairs of IBs in which each pair has same behaviour. The results are in good agreement with each other. The  $J^{(2)}$  is significantly higher than  $J^{(1)}$  over a large rotational frequency range in A=190 mass region.

## 4. Conclusion

The present study is an effort to explore the SDIBs in A=190 mass region. We have been able to confirm 16 pairs of IBs firmly in 190 mass region. It is well known that the two rotational bands having same dynamic and kinematic moment of inertia are considered to be as identical to each other. This fact seems to suggest that the band-head moment of inertia of these bands should be same. The problem of identical bands in Super-Deformed nuclei is investigated successfully. Six pairs of IBs are reported which was not mentioned earlier in the literature. With the help of modified VMI model, we find an excellent agreement between the experimental and theoretical energies. Also, we calculated kinematic and dynamic moment of inertia along with rotational frequencies and in all the six cases the results are in good agreement within the pair. In all the cases  $J^{(2)}$  is significantly higher than  $J^{(1)}$ . This work can be helpful in the field of nuclear physics.

## **References:**

- C. Baktash, B. Haas, and W. Nazarewicz, Annu. Rev. Nucl. Part. Sci. 45, 485 (1995). https://doi.org/10.1146/annurev.ns.45.120195.002413
- L. B. Karlsson, I. Ragnarsson, and S. Aberg, Phys. Lett. B 416, 16 (1998). https://doi.org/10.1016/S0370-2693(97)01324-5
- 3. T. Byrski, F. A. Beck, D. Curien, C. Schuck, P. Fallon, A. Alderson, I. Ali, M. A. Bentley, A. M. Bruce, P. D. Forsyth, D. Howe, J. W. Roberts, J. F. Sharpey-Schafer, G. Smith, and P. J. Twin, Phys. Rev. Lett. **64**, 1650 (1990). https://doi.org/10.1103/PhysRevLett.64.1650
- F. Azaiez, W. H. Kelly, W. Korten, F. S. Stephens, M. A. Deleplanque, R. M. Diamond, A. O. Macchiavelli, J. E. Draper, E. C. Rubel, C. W. Beausang, J. Burde, J. A. Becker, E. A. Henry, S. W. Yates, M. J. Brinkman, A. Kuhnert, and T. F. Wang, Phys. Rev. Lett. 66, 1030 (1991).
- I. Ahmad, M. P. Carpenter, R. R. Chasman, R. V. F. Janssens, and T. L. Khoo, Phys. Rev. C 44, 1204 (1991). <a href="https://doi.org/10.1103/PhysRevC.44.1204">https://doi.org/10.1103/PhysRevC.44.1204</a>
- R. F. Casten, N. V. Zamr, P. B. Von, and W. T. Chou, Phys. Rev. C 45, R1413 (1992). https://doi.org/10.1103/PhysRevC.45.R1413
- M. Saha and S. Sen, Phys. Rev. C 46, R1587 (1992). https://doi.org/10.1103/PhysRevC.46.R1587
- 8. A. M. Khalaf, M. D. Okasha, and K. M. Abdelbased, Prog. Phys. 13, 50 (2017).
- C. Baktash, J. D. Garrett, Phys. Rev. Lett. 69, 1500 (1992). https://doi.org/10.1103/PhysRevLett.69.1500
- 10. J. Y. Zeng, S. X. Liu, Y. A. Lei, and L. Yu, Phys. Rev. C 63, 024305 (2001).
- C. Baktash, D. F. Winchell, J. D. Garrett, and A. Smith, Nucl. Phys. A 557, 145 (1993). https://doi.org/10.1016/0375-9474(93)90537-8
- 12. M. Saha and S. Sen, Phys. Rev. C 50, 2794 (1994), https://doi.org/10.1103/PhysRevC.50.2794
- M. A. J. Mariscotti, G. Scharff-Goldhaber, and B. Buck, Phys. Rev. 178, 1864 (1969). https://doi.org/10.1103/PhysRev.178.1864

- 14. A. K. Jain and A. Goel, Int. J. Mod. Phys. E 02, 451 (1993). https://doi.org/10.1142/S0218301393000170
- 15. P. Jain, V. S. Uma, A. Goel, and S. K. Mandal, Eur. Phys. J. Plus 134, 72 (2019).
- https://doi.org/10.1140/epip/i2019-12443-3

  16. V. S. Uma, A. Goel, A. Yadav, and A. K. Jain, Pram. J. Phys. **86**, 185 (2016). https://doi.org/10.1007/s12043-015-1013-9