https://doi.org/10.61092/iaea.yjpc-cns6

INDC(NDS)-0794
Distr. EN

IAEA
International Atomic Energy Agency

INDC International Nuclear Data Committee

TABLE OF RECOMMENDED NUCLEAR MAGNETIC DIPOLE MOMENTS: PART I, LONG-LIVED STATES

N.J. Stone

Oxford Physics, Clarendon Laboratory, Parks Road, Oxford U.K. OX1 3PU and
Department of Physics and Astronomy, University of Tennessee, Knoxville,
USA, TN 37996-1200

November 2019

IAEA Nuclear Data Section
Vienna International Centre, P.O. Box 100, 1400 Vienna, Austria

Selected INDC documents may be downloaded in electronic form
from *http://nds.iaea.org/publications*
or sent as an e-mail attachment.
Requests for hardcopy or e-mail transmittal should be directed to
NDS.Contact-Point@iaea.org
or to:
Nuclear Data Section
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 Vienna
Austria

Printed by the IAEA in Austria
November 2019

TABLE OF RECOMMENDED NUCLEAR MAGNETIC DIPOLE MOMENTS: PART I, LONG-LIVED STATES

N.J. Stone

Oxford Physics, Clarendon Laboratory, Parks Road, Oxford U.K. OX1 3PU and Department of Physics and Astronomy, University of Tennessee, Knoxville, USA, TN 37996-1200

ABSTRACT

This Table gives recommended values of static magnetic dipole moments of ground states and excited states of atomic nuclei throughout the periodic table having lifetimes > ~ 1 ms. To aid identification of the states, their excitation energy, half-life, spin and parity are also provided. The literature search covers the period to April 2019.

Report on a Special Service Agreement

November 2019

Contents

INTRODUCTION

This Table of Recommended Magnetic Dipole Moments differs fundamentally from the various compilations of nuclear magnetic dipole moments which have been published in the past forty years [1,2,3] which derived from the older exhaustive listing of Fuller [4]. The more recent compilations merely added new results, in the form they had been published, without amendment or correction and with no indication as to an adopted 'best' value. The new Table contains, for each nuclear state, a single recommended value for the magnetic moment of that state covered by a single reference to the relevant measurement. Adjustments to the published results have been made in a systematic fashion, as detailed in this introduction, to allow for our limited knowledge of necessary corrections. For those who wish to see data on all measurements, Ref. [3] and the IAEA website tabulation of Mertzimekis [5] are available.

The selected and recommended entry is, in many cases, the most recent published result and the reference will guide the interested reader to other, usually less accurate, results. However, there are many stable isotopes for which long-standing values, now taken as reference data for other isotopes of the same element, are preferred. No averaging has been attempted, even when more than one result of similar quality exists for the same state. Authors' stated errors have been respected (except as noted with regard to corrections) but combination of errors in results from different experiments and techniques on a statistical basis is not to be trusted and any apparent reduction in final uncertainty illusory. Where they exist, long sequences of results from a single source have been preferred since the likelihood of erratic behaviour is less than if different sources and techniques are intermixed. Exceptions to this procedure have been made for several essential reference moments, taken without change from the latest Review of Particle Physics [6] and denoted R (Reference) in the method column of this Table. The same applies to the anti-proton and ^{3}He entries, also denoted 'R'.

The table of recommended magnetic dipole moments given in Appendix 1 includes all states with lifetimes longer than ~ 1 ms on which measurements have been reported in the Nuclear Science Reference (NSR) bibliographic database, with last update April 2019. A second Table for all shorter- lived states is in the course of preparation.

The measurement of a nuclear magnetic dipole moment

In principle the measurement of a nuclear magnetic dipole is a simple matter of applying a known magnetic field to the nucleus and measuring the resulting Zeeman-like splitting of the energy levels characterised by the nuclear spin I and its projection M. In practice such a measurement is impossible – always a medium intervenes between the source of the field and the nucleus and this intervention modifies the strength of the field acting upon the nucleus. Beside the larger and more obvious para-magnetism and collective (ferro-, ferri-, antiferro-) magnetism, this medium effect in 'non-magnetic' materials is commonly known as diamagnetism. Basic diamagnetism refers to screening of the applied field by atomic or ionic electrons, whereas the additional influence of the chemical environment of the atom or ion is known as the chemical shift. In metals the weak paramagnetism of the conduction electrons gives rise to the additional Knight shift. The accuracy of extraction of the 'bare' nuclear moment from measurements in which external, known, magnetic fields are the major source of the splitting is limited by our knowledge of these corrections however well the splitting itself can be measured. Examples of techniques which deliver absolute nuclear moments only after diamagnetic correction are NMR and β-NMR in gases, liquids and non-magnetic solids and certain atomic beam methods. Perturbed angular correlation in an external field is such a method applicable to short-lived nuclear states.

In other major techniques measurement is made of the hyperfine structure produced by interaction of unpaired electrons of an atom or ion with the nuclear magnetic dipole and electric quadrupole moments through the familiar A and B parameters. Ratios of these parameters measured on different nuclear states and isotopes give ratios of their moments, subject to further correction discussed below, but not the moments themselves. In calibration, the ratio is needed to the interaction strength of a 'reference' isotope or state of which the 'corrected moment' has been determined by a direct method as outlined in the previous paragraph. Thus the corrections described therein affect all results. Examples of such indirect methods are optical and laser spectroscopy and low field atomic beam studies.

The above outline of methods based on internal interactions ignores a second significant problem specific to determination of the nuclear magnetic dipole moment – the hyperfine anomaly. Whilst external applied fields are uniform over the nuclear volume, the strongest indirect interaction, the so-called contact interaction due to s-electron polarization at the nucleus, is proportional to the local s-electron density which, although falling exponentially from the origin for a point nuclear charge, for real nuclei varies over the nuclear volume to a degree dependent upon the nuclear charge density distribution. The nuclear magnetic moment is composed of parts dependent upon the distribution of spin and orbital angular momentum which in turn couple to the local electron density (the spin part) and the average density within the orbital motion (the orbital part). When the products of the two moment contributions and varying field are considered it is clear that the total interaction is not simply proportional to the total (spin + orbital) moment. In effect, this means that hyperfine A parameter ratios do not equate to moment ratios but differ by a factor which depends upon the detailed structure of the two nuclear states involved. This factor is known as the hyperfine anomaly (HFA). Since, in general, the magnetic hyperfine interaction in any system may have both s-electron and non- s-electron contributions, the HFA, in principle, will differ for the same nuclear state in different systems. Examples of this difference exist between atomic hyperfine interactions and those found in dilute ferromagnetic alloys [7].

In preparing the present Table of Recommended Magnetic Dipole Moments (Appendix 1), the diamagnetic, Knight shift and HFA corrections have been thoroughly reviewed. The practice adopted for each is described in more detail in the following sections.

Diamagnetism and the Chemical Shift

This correction is in general small, but has features which make its calculation complex. It involves the reaction of multi-electron states to an applied magnetic field and thus differs in detail for free atoms, ions and all chemical compounds of a given element. Its application is necessary to extract the bare nuclear dipole moment from experiments and is of particular importance when the experimental measurement is of high precision. The correction increases from tens of ppm in light elements to over 2% in francium. It is important that the correction be applied with uniformity and to recognize that it is not precisely known.

Previous Tables have listed the diamagnetic corrections $1/(1 - \sigma)$ which were applied, either by the original authors or by the Table compilers. The early compilation of Fuller [4] adopted corrections by

Dickinson (D) [8] dating from 1950, with an assumed uncertainty of 5%. The Raghavan Table [1] gave a listing of corrections by Lin, Johnson and Feiock (LJF) from 1972, later published in expanded form [9]. The corrections were applied as if they were exact, with no allowance for uncertainty in their value. The two corrections differ by a factor which increases with atomic number such that σ(LJF)/σ(D) is ~ 1.1 for iron, 1.4 for gadolinium and 1.7 for lead. The LJF correction reaches 0.1% for sulphur, 0.5% for ruthenium, 1% for gadolinium and 2% for francium. Applying the correction as if it were exact led to listings which suggested great precision, however this precision was not well established. The Raghavan corrections, again treated as exact, were adopted by Stone [2,3].

Developments in computation have led to a great improvement in multi-electron system calculations over the intervening years. Increased application of nuclear magnetic resonance in sciences beyond physics has produced strong pressure for reliable calculations of diamagnetic and chemical shifts. The table in Appendix 2 shows comparison (for those 29 elements for which recent results are available) between the best calculations of σ in very dilute systems with the results of LJF. It is seen that there is a reasonably consistent deviation from the LJF corrections and that, for the considerable number of measurements for which the correction is relevant as compared to experimental errors, an adjustment downwards from the LJF σ values by a factor ~ 0.75 is established. In the new Table of Magnetic Dipole Moments (Appendix 1) the computed σ values have been applied for these 29 elements. For the other elements a correction with σ = 0.75(10)σ(LJF), shown in Appendix 2, has been applied. Chemical shifts and variation in the factor 0.75 have been allowed for by introducing uncertainty in σ of 10%.

These changes result in many minor adjustments both in the adopted moment value and in the assigned error. The moments previously listed as most accurate, in most cases, are now given with reduced precision, reflecting the uncertainty in the diamagnetic correction.

The Knight shift

Where experiments have been made on nuclei in conducting materials correction of the applied field for conduction electron paramagnetism is required. This situation occurs in earlier measurements using the beta-NMR technique although lately the difficulty of this correction has been realized and experiments conducted in non-conductors. The problem is that the nuclei under study are isolated in their host environment, which makes calculation complex and there is usually no reference moment available to allow the shift to be determined. There are few examples in the Table which require Knight shift correction and for these the authors estimates have been accepted.

The Hyperfine Anomaly

The HFA, as outlined above, relates to the different ways in which spin and orbital components of nuclear magnetic moments interact with polarized s-electrons. A further complication is that the field at the nucleus may comprise an s-electron contribution, which is subject to the anomaly, and a non- s-electron contribution which, if relativistic affects are neglected, is not. Thus the magnitude of the anomaly depends upon both the distribution of magnetization within the nucleus and its electronic environment, including different electron configurations in a given ion. Although computation of these effects has made considerable strides in recent decades, after due consultation it was realised that the time is not yet ripe to attempt a generally applicable correction for the anomaly.

The HFA is generally of order 10^{-3} – 10^{-4}, however, in cases where the nuclear moment is the small resultant of opposing spin and orbital components, it can approach 10%. Such cases are known in $d_{3/2}$ states in Ir and Au isotopes [7]. HFA's tend to increase in larger nuclei. Authors analyzing recent experiments in heavier elements Tl, Bi and Fr have made serious attempts to estimate and correct their results for the HFA. The results of these attempts have been adopted in the recommended moments. A valuable compilation of experimental values of the HFA published prior to 2013 is available and references therein give access to relevant discussions [10].

Limited publication

The great majority of entries in the Table of Appendix 1 have been fully published in the regular journals cited. There are, however, some which, whilst not published in a manner allowing assessment and potential adjustment, have been included in earlier compilations and stand as the only available measurements for the states concerned. These are denoted by the letter L, indicating limited publication, and are included, without recommendation, for the convenience of the reader.

POLICIES

Signs

Signs are given when the sign can be determined from experimental data. Where the sign is not given by the measurement, no sign is given in the Table, although it can sometimes be inferred either from systematics or from the magnitude of the result.

Results and Uncertainties

Experimental values and their associated errors are subject to a policy of limiting significant figures. Numerical errors with digits above 15 have in most cases been rounded to 2 and others have been rounded to give no more significant figures than the rounded error would allow. Thus a published value 0.953(65) has been adjusted to 0.95(7) and 0.25(16) to 0.3(2).

Additional information

To assist in identification of the nuclear state involved, the Table in Appendix 1 includes the energy (in keV), half-life, and spin/parity of the state. The method used in the experiment is given, although for all details the original publication should be consulted.

References are given in the Table in the Nuclear Science References (NSR) keyword format and an abbreviated journal form. Listings of abbreviations used to identify methods and journals are given in Appendices 3 and 4, respectively, following the explanation of the Table.

Acknowledgements

The Table of Recommended Magnetic Dipole Moments owes much to the compilations of Gladys Fuller and Pramila Raghavan, although, as specified above, many detailed corrections have been made to individual entries. Fulsome thanks are also due to members of the Consultant's group brought together by the IAEA at a meeting in Vienna in 2017 [11]. Valuable assistance to the author concerning moments of longer-lived states has been received from Mark Lloyd Bissell and, regarding the present state of theory and calculation of the hyperfine anomaly, from Jonas Persson. Special thanks are due to Karol Jackowski not only for advice and assistance in the area of modern calculation of diamagnetic corrections but also for his hospitality during the author's visit to Warsaw in 2018.

The Table could not have been produced without extensive assistance at various stages from staff of the National Nuclear Data Centre, Brookhaven National Laboratory, in particular Boris Pritychenko and Joann B. Totans. At the IAEA in Vienna the project has been under the watchful eye of Paraskevi (Vivian) Dimitriou and her predecessors of the Nuclear Data Section and their help and support is gratefully acknowledged.

Finally, thanks are due to the late Richard A. Meyer, who initiated the undertaking, and to Jirina Rikovska Stone for her unfailing assistance and encouragement.

References

1. P. Raghavan, At. Data Nucl. Data Tables **42** (1989) 189.
2. N.J. Stone, At. Data Nucl. Data Tables **90** (2005) 75.
3. N.J. Stone, INDC(NDS)-0658, IAEA, Vienna (2014).
4. G.H. Fuller, J. Phys. Chem. Ref. Data **5** (1976) 835.
5. T.J. Mertzimekis, Nucl. Inst. Meth. Phys. Res. A **807** (2016) 55.
6. K.A. Olive et al., Chin. Phys. C **38** (2014) 090001.
7. G.J. Perlow et al., Phys. Rev. Lett. **23** (1969) 680.
8. W.C. Dickinson, Phys. Rev. **80** (1950) 563.
9. W.R. Johnson, D. Kolb, K.–N. Huang, At. Data Nucl. Data Tables **28** (1983) 333; references therein.
10. J.R. Persson, At. Data and Nucl. Data Tables **99** (2013) 62.
11. N.J. Stone, A.E Stuchbery and P. Dimitriou, Summary Report of the Consultant's Meeting on Evaluation of Nuclear Moments, INDC(NDS)-0732, IAEA, Vienna (2017).

Appendix 1

TABLE OF RECOMMENDED MAGNETIC DIPOLE MOMENTS

Nucleus	Ex	T1/2	Jπ	m(nm)	Method	NSR Keynumber	Journal Reference
0 n 1	0	10.2 m	1/2+	-1.9130427(5)	R	2014Ol01	Chin. Phys. C38 090001 (2014)
1 H 1	0	stable	1/2+	+2.792847351(9)	R	2014Ol01	Chin. Phys. C38 090001 (2014)
antiproton	0	-	1/2+	-2.792847344(4)	R	2017Sm05	Nature 550 371 (2017)
1 H 2	0	stable	1+	+0.857438231(5)	R	2014Ol01	Chin. Phys. C38 090001 (2014)
1 H 3	0	12.33 y	1/2+	+2.978962460(14))	R	2014Ol01	Chin. Phys. C38 090001 (2014)
2 He 3	0	stable	1/2+	-2.12762531(3)	R	2012Mo42	RMP 84 1527 (2012)
3 Li 6	0	stable	1+	+0.822043(3)	NMR	2012Ja19	PNMRS 67 49 (2012)
3 Li 7	0	stable	3/2-	+3.256407(12)	NMR	2012Ja19	PNMRS 67 49 (2012)
3 Li 8	0	840 ms	2+	+1.65350(2)	b-NMR	1978Wi13/1962Co08	PL A67 423 (78)/PR 126 1506 (62)
3 Li 9	0	178 ms	3/2-	3.43666(6)	b-NMR	2005Bo45	PR C72 044309 (05)
3 Li 11	0	8.75 ms	3/2-	+3.6711(2)	b-NMR	2008Ne11	PRL 101 132502 (08)
4 Be 7	0	53.2 d	3/2-	-1.399280(4)	LMDR	2008Ok01	PRL 101 212502 (08)
4 Be 9	0	stable	3/2-	-1.177430(5)	NMR	2013An23	CPL 588 57 (2013)
4 Be 11	0	13.8 s	1/2+	-1.6816(8)	b-NMR	1999Ge18	PRL 83 3792 (99)
5 B 8	0	0.77 s	2+	1.0355(3)	b-NMR	1973Mi01	JPJS 34 156 (73)
5 B 10	0	stable	3+	1.8004636(8)	NMR	2009Ja11	JCP 130 044309 (2009)
5 B 11	0	stable	3/2-	2.688378(1)	NMR	2009Ja11	JCP 130 044309 (2009)
5 B 12	0	20.2 ms	1+	+1.003(1	b-NMR	1990Mi16	NP A516 365 (90)
5 B 13	0	17.3 ms	3/2-	+3.1778(5)	b-NMR	2004Na38	NP A746 509c (04)
5 B 14	0	12.5 ms	2-	1.185(5)	b-NMR	1995Ok04	PL B354 41 (95)
5 B 15	0	9.9 ms	3/2-	2.659(15)	b-NMR	1995Ok04	PL B354 41 (95)
5 B 17	0	5.1 ms	(3/2-)	2.55(2)	b-NMR	1996Ue02	PR C53 2142 (96)
6 C 9	0	126 ms	3/2-	1.3914(5)	b-NMR	1995Ma48	NP A558 153c (1995)
6 C 11	0	20.4 m	3/2-	-0.964(1)	AB	1970Wo11	ZP 236 337 (70)
6 C 13	0	stable	1/2-	+0.702369(4)	NMR	2005An15	CPL 411 111 (2005)
6 C 15	0	2.45 s	1/2+	1.720(9)	b-NMR	2002As06	NP A704 88c (02)
6 C 17	0	193 ms	(3/2+)	0.758(4)	b-NMR	2002Og02	EurPJ A13 81 (02)
7 N 12	0	11.0 ms	1+	0.4571(1)	b-NMR	2010Zh03	Chin Phys Lett 27 022102 (10)
7 N 13	0	9.96 m	1/2-	0.3219(4)	AB	1964Be24	PR 136 B27 (64)
7 N 14	0	stable	1+	+0.403573(2)	NMR	2005An15	CPL 411 111 (2005)
7 N 15	0	stable	1/2-	-0.2830569(14)	NMR	2005An15	CPL 411 111 (2005)
7 N 16	0	7.13 s	2-	1.9856(11)	b-NMR	2001Ma42	PRL 86 3735 (01)

7 N 17	0	4.17 s	1/2-	0.3552(4)	b-NMR	2009De34	PR C80 037306 (09)
7 N 18	0	624 ms	1-	0.3274(4)	b-NMR	2009De34	PR C80 037306 (09)
7 N 19	0	0.27 s	1/2-	0.305(15)	b-NMR	2004Ka22	NP A734 481 (04)
8 O 13	0	8..6 ms	3/2-	1.3892(3)	b-NMR	1996Ma38	HFI 97/98 519 (96)
8 O 15	0	122 s	1/2-	0.71908(12)	b-NMR	1993Ta28	HFI 78 105 (93)
8 O 17	0	stable	5/2+	-1.893543(10)	NMR	2005An15	CPL 411 111 (2005)
8 O 19	0	26.9 s	5/2+	1.53238(7)	b-NMR	1999Mi16	PL B457 9 (99)
9 F 17	0	64.5 s	5/2+	+4.7213(3)	b-NMR	1993Mi33	HFI 78 111 (93)
9 F 19	0	stable	1/2+	+2.628321(4)	NMR	2016AD43	Phys Chem Chem Phys 18 18483 (2016)
9 F 20	0	11.1 s	2+	+2.09335(9)	b-NMR	L	ARO p44 (96)
9 F 21	0	4.16 s	5/2+	3.9194(12)	b-NMR	1999Mb13	HFI 120/121 673 (99)
9 F 22	0	4.23 s	4+	(+)2.6944(4)	b-NMR	2010Mi13	NP A834 75c (10)
10 Ne 17	0	109 ms	1/2-	+0.7873(14)	CFBLS	2005Ge06	PR C71 064319 (2006)
10 Ne 19	0	17.2 s	1/2+	-1.88515(7)	b-NMR	1982Ma39	PR C26 1753 (82)
10 Ne 21	0	stable	3/2+	-0.66170(3)	MB	1957La08	PR 107 1202 (57)
10 Ne 23	0	37.2 s	5/2+	-1.0794(10)	b-NMR	1994Hi09	Z. Naturforsch. 49a 27 (94)
10 Ne 25	0	0.60 s	1/2+	-1.0060(5)	CFBLS	2005Ge06	PR C71 064319 (2006)
11 Na 20	0	0.448 s	2+	+0.3694(2)	OP/RD	1975Sc20	NP A246 187 (75)
11 Na 21	0	22.5 s	3/2+	+2.38610(4)	AB	1965Am01	PR 137 B1157 (65)
11 Na 22	0	2.60 y	3+	+1.746(3)	AB	1949Da01	PR 76 1068 (49)
11 Na 23	0	stable	3/2+	+2.21750(3)	NMR	2012An18	CPL 532 1 (2012)
11 Na 24	0	15.0 h	4+	+1.6903(8)	AB	1966Ch15/1973CoZG	PR 150 933 (66)/BAPS 18 727 (73)
	472	20.2 ms	1+	-1.931(3)	b-NMR	1980He08	PL B94 28 (80)
11 Na 25	0	59.1 s	5/2+	+3.683(4)	OP/RD	1975De11	ZP A273 15 (75)
11 Na 26	0	1.07 s	3+	+2.851(2)	ABLS	1978Hu12	PR C18 2342 (78)
11 Na 27	0	0.30 s	5/2+	+3.895(5)	ABLS	1978Hu12	PR C18 2342 (78)
11 Na 28	0	30.5 ms	1+	+2.426(3)	ABLS	1978Hu12	PR C18 2342 (78)
11 Na 29	0	44 ms	3/2+	+2.449(8)	ABLS	1978Hu12	PR C18 2342 (78)
11 Na 30	0	53 ms	2+	+2.083(10)	ABLS	1978Hu12	PR C18 2342 (78)
11 Na 31	0	17.3 ms	3/2+	+2.305(8)	ABLS,R	1978Hu12	PR C18 2342 (78)
12 Mg 21	0	122 ms	5/2+	-0.983(7)	CFBLS/b-NMR	2009Kr05	PL B 678 465 (09)
12 Mg 23	0	11.3 s	3/2+	-0.5363(3)	CLS	2017Yo05	JP G44 075104 (2017)
12 Mg 25	0	stable	5/2+	-0.85533(3)	NMR	2013An23	CPL 588 57 (2013)
12 Mg 27	0	9.46 m	1/2+	-0.4106(15)	CLS	2008Ko05	PR C77 034307 (08)
12 Mg 29	0	1.30 s	3/2+	+0.9779(6)	b-NMR/LRS	2008Ko05	PR C77 034307 (08)

12 Mg 31	0	236 ms	1/2+	-0.88340(15)	b-NMR/LRS	2008Ko05	PR C77 034307 (08)
12 Mg 33	0	90.5 ms	3/2-	-0.7455(5)	b-NMR/LRS	2007Yo06	PRL 99 212501 (07)
13 Al 23	0	470 ms	5/2+	+3.89(2)	b-NMR	2006Oz04	PR C74 021301 (06)
13 Al 24	426	130 ms	1+	2.99(9)	b-NMR	2007NI14	HFI 180 71 (07)
13 Al 25	0	7.18 s	5/2+	3.6447(12)	b-NMR	1976Mi11	PR C14 376 (76)
13 Al 26	0	$7x10^5$ y	5+	+2.803(4)	ABLS	1996Co04	JP G22 99 (96)
13 Al 27	0	stable	5/2+	+3.64070(2)	NMR	2015An17	JCP 143 074301 (2015)
13 Al 28	0	2.24 m	3+	3.241(5)	b-NMR	1981Mi14	PL 106B 38 (81)
13 Al 30	0	3.62 s	3+	3.012(7)	b-NMR	2005Ue01	PL B615 186 (2005)
13 Al 31	0	644 ms	5/2(+)	+3.832(5)	b-NMR	2006Hi18	PL B643 257 (06)
13 Al 32	0	33 ms	1+	1.953(2)	b-NMR	2006Hi18	PL B643 257 (06)
13 Al 33	0	41.7 ms	(5/2)+	+4.090(5)	b-NMR	2006Hi18	PL B643 257 (06)
13 Al 34	0	56 ms	(4-)	(+)2.157(16)	b-NMR	2008Hi01	PL B658 203 (08)
14 Si 27	0	4.15 s	5/2+	(-)0.8652(3)	b-NMR	1999MaZK	ARO 54 (98)
14 Si 29	0	stable	1/2+	-0.555052(3)	NMR	2006Ma97	JPhysChem A110 11462 (2006)
14 Si 33	0	6.1 s	3/2+	1.21(3)	OP/RD	92Ma52	HFI 74 223 (1992)
14 Si 35	0	0.78 s	(7/2)-	(-) 1.639(4)	b-NMR	2007Ne14	Eur Phys J (Sp Topics) 150 149 (07)
15 P 28	0	270 ms	3+	0.312(3)	b-NMR	2010 MaZJ	7th China-Japan NP Symp 260 (10)
15 P 29	0	4.14 s	1/2+	1.2344(3)	b-NMR	2009Zh53	Chin Phys C33 Supp 1 218 (09)
15 P 31	0	stable	1/2+	+1.130925(5)	NMR	2011La24	JPhysChem A115 10617 (2011)
15 P 32	0	14.28 d	1+	-0.2528(2)	ENDOR	1957Fe32	PR 107 1462 (57)
16 S 31	0	2.6 s	1/2+	0.48793(8)	b-NMR	1976Mi16	PR C14 2335 (76)
16 S 33	0	stable	3/2+	+0.64325(2)	NMR	2005An15	CPL 411 111 (2005)
16 S 35	0	87.4 d	3/2+	+1.00(4) or -1.07(4)	MA	1954Bu05	PR 93 193 (54)
17 Cl 32	0	298 ms	1+	+1.115(6)	b-NMR	2000Ro30	PR C62 044312 (00)
17 Cl 33	0	2.51 s	3/2+	+ 0.7547(3)	b-NMR	2004Ma98	NP A746 493c (04)
17 Cl 35	0	stable	3/2+	+0.82170(2)	NMR	2013Ja17	JCP 139 234402 (2013)
17 Cl 36	0	$3.0x10^5$ y	2+	+1.2849(3)	N	1955So10	PR 98 1316 (55)
17 Cl 37	0	stable	3/2+	+0.68400(1)	NMR	2013Ja17	JCP 139 234402 (2013)
17 Cl 38	0	37.3 m	2-	2.05(2)	b-NMR	1972La22	ZP 252 242 (72)
17 Cl 44	0	0.56 s	(2-)	(-)0.5498(4)	b-NMR	2010De11	PR C81 034308 (10)
18 Ar 33	0	0.173 s	1/2+	-0.723(6)	CFBLS/b-NMR	1996Kl04	NP A607 1 (96)
18 Ar 35	0	1.78s	3/2+	+0.6320(2)	b-NMR	2002Ma41	NP A701 383c (02)
18 Ar 37	0	35.0 d	3/2+	+1.146(5)	N,OP/RD	1988PiZY	BAPS 33 1564 (88)
18 Ar 39	0	269 y	7/2-	-1.590(15)	CFBLS/b-NMR	1996Kl04	NP A607 1 (96)

18 Ar 41	0	1.82 h	7/2-	-1.310(8)	CFBLS	2008Bl01	NP A799 30 (2008)
18 Ar 43	0	5.37 m	5/2(-)	-1.022(6)	CFBLS	2008Bl01	NP A799 30 (2008)
19 K 35	0	178 ms	(3/2)+	0.392(7)	b-NMR	2006Me04	PR C73 024318 (06)
19 K 36	0	0.34 s	2+	(+)0.548(1)	OP/RD	1975Sc20	NP A246 187 (75)
19 K 37	0	1.23 s	3/2+	+0.20321(6)	OP/RD	1971Vo03	ZP A244 44 (71)
19 K 38	0	7.64 m	3+	+1.371(6)	AB	1982To02	PL 108B 169 (82)
19 K 39	0	stable	3/2+	+0.391470(8)	NMR	2012An18	CPL 532 1 (2012)
19 K 40	0	$1.25x10^{9}$ y	4-	-1.29797(3)	N	1974Sa24	ZNat 29a 1754 (74)
19 K 41	0	stable	3/2+	+0.214872(5)	NMR	2012An18	CPL 532 1 (2012)
19 K 42	0	12.36 h	2-	-1.1425(6)	AB	1969Ch20/1973CoZG	PR 184 1102 (69)/BAPS 18 727 (73)
19 K 43	0	22.3 h	3/2+	+0.1633(8)	ABLS	1982To02/1982Du06	PL 108B 169 (82)/JPPa 43 509 (82)
19 K 44	0	22.1 m	2-	-0.856(4)	ABLS	1982To02/1982Du06	PL 108B 169 (82)/JPPa 43 509 (82)
19 K 45	0	17.8 m	3/2+	+0.1734(8)	AB	1982To02	PL 108B 169 (82)
19 K 46	0	115 s	2-	-1.051(6)	ABLS	1982To02	PL 108B 169 (82)
19 K 47	0	17.5 s	1/2+	+1.933(9)	ABLS	1982To02	PL 108B 169 (82)
19 K 49	0	1.26 s	1/2+	+1.3386(8)	CLS	2013Pa11	PRL 110 172503 (2013)
19 K 51	0	365 ms	(3/2+)	+0.513(2)	CLS	2013Pa11	PRL 110 172503 (2013)
20 Ca 39	0	0.86 s	3/2+	1.02140(16)	b-NMR	1976Mi05	PL 61B 155 (76)
20 Ca 41	0	$1.0x10^{5}$ y	7/2-	-1.59443(7)	N	1962Br30	PRL 9 166 (62)
20 Ca 43	0	stable	7/2-	-1.31733(6)	NMR	2013An23	CPL 588 57 (2013)
20 Ca 45	0	162.6 d	7/2-	-1.3264(13)	CLS	2015Ru02	PR C91 041304(R)(2015)
20 Ca 47	0	4.54 d	7/2-	-1.4064(11)	CLS	2015Ru02	PR C91 041304(R)(2015)
20 Ca 49	0	8.72 m	3/2-	-1.3799(8)	CLS	2015Ru02	PR C91 041304(R)(2015)
20 Ca 51	0	10.0 s	3/2-	-1.0496(11)	CLS	2015Ru02	PR C91 041304(R)(2015)
21 Sc 41	0	0.60 s	7/2-	+5.4283(14)	b-NMR	1990Mi16	NP A516 365 (90)
21 Sc 43	0	3.89 h	7/2-	+4.526(10)	CLS	2011Av01	J.Phys.G 38 025104 (2011)
21 Sc 44	0	3.97 h	2+	+2.498(5)	CLS	2011Av01	J.Phys.G 38 025104 (2011)
	271	58.6 h	6+	+3.831(12)	CLS	2011Av01	J.Phys.G 38 025104 (2011)
21 Sc 45	0	stable	7/2-	+4.75400(8))	NMR	2016An22	CPL 660 127 (2016)
21 Sc 46	0	83.79 d	4+	+3.040(8)	CLS	2011Av01	J.Phys.G 38 025104 (2011)
21 Sc 47	0	3.35 d	7/2-	+5.34(2)	AB	1966Co13	PR 141 1106 (66)
21 Sc 48	0	43.7 h	6+	3.737(12)	NMR/ON	2007Oh10	HI 180 79 (07)
21 Sc 49	0	57.2 m	7/2-	(+)5.61(3)	NMR/ON	2012Oh01	PRL 109 032504 (12)
22 Ti 43	0	0.509 s	7/2-	0.85(2)	b-NMR	1993Ma67	HFI 78 123 (93)
22 Ti 45	0	184.8 m	7/2-	0.095(2)	AB	1966Co19	PR 148 1157 (66)
22 Ti 47	0	stable	5/2-	-0.78814(11))	N	1965Dr03	PhMg 12 1061 (65)

22 Ti 49	0	stable	7/2-	-1.10370(14))	N	1965Dr03/1953Je16	PhMg 12 1061 (65)/PR 92 1262 (53)
23 V 48	0	15.97 d	4+	2.012 (11)	NMR/ON	1980Bu11	HFI 8 59 (80)
23 V 49	0	330 d	7/2-	4.47(5)	EPR	1957We17	BAPS 2 31 (57)
23 V 50	0	1.4x10*^{17} y	6+	+3.3442(4)	N	1981Ha26	ZP A300 111 (81)
23 V 51	0	stable	7/2-	+5.1464(7)	N	1981Ha26/1951Pr02	ZP A300 111 (81)/PR 81 20 (51)
24 Cr 49	0	41.9 m	5/2-	0.476(3)	AB	1970Jo27	PS 2 16 (70)
24 Cr 51	0	27.7 d	7/2-	(-)0.934(5)	AB	1970Ad07	ArkF 40 457 (70)
24 Cr 53	0	stable	3/2-	-0.47431(7)	N	1953Al06	HPAc 26 426 (53)
25 Mn 50	225	1.75 m	5+	+2.76(1)	TLS	2010Ch15	PL B690 346 (10)
25 Mn 51	0	46.2 m	5/2-	+3.575(4)	CLS	2015Ba49	PL B750 176 (2015)
25 Mn 52	0	5.80 d	6+	+3.0622(12)	AB	1966Ad03	ArkF 31 549 (66)
	378	21.1 m	2+	0.00766(8)	AB	1971Jo10	NP A166 306 (71)
25 Mn 53	0	3.7x10^6 y	7/2-	+5.033(5)	CLS	2016Ba44	PL B760 387 (2016)
25 Mn 54	0	312 d	3+	3.297(3)	CLS	2015He28	PR C92 044311(2015)
25 Mn 55	0	stable	5/2-	+3.4669(6)	N	1974Lu08	ZNat 29a 1467 (74)
25 Mn 56	0	2.58 h	3+	+3.240(2)	CLS	2015He28	PR C92 044311(2015)
25 Mn 57	0	85.4 s	5/2-	+3.481(2)	CLS	2016Ba44	PL B760 387 (2016)
25 Mn 58	0	3.0 s	1+	+2.623(2)	CLS	2015He28	PR C92 044311(2015)
	72	65.4 s	4+	+3.062(2)	CLS	2015He28	PR C92 044311(2015)
25 Mn 59	0	4.6 s	5/2-	+3.494(3)	CLS	2016Ba44	PL B760 387 (2016)
25 Mn 60	0	0.28 s	1+	+2.488(7)	CLS	2015He28	PR C92 044311(2015)
	272	1.77 s	4+	+3.400(2)	CLS	2015He28	PR C92 044311(2015)
25 Mn 61	0	0.71 s	5/2-	+3.533(2)	CLS	2016Ba44	PL B760 387 (2016)
25 Mn 62	0	92 ms	1+	+2.384(7)	CLS	2015He28	PR C92 044311(2015)
	0 + x	671 ms	4+	+3.170(3)	CLS	2015He28	PR C92 044311(2015)
25 Mn 63	0	0.28 s	5/2-	+3.439(3)	CLS	2016Ba44	PL B760 387 (2016)
25 Mn 64	0	90 ms	1+	+2.085(3)	CLS	2015He28	PR C92 044311(2015)
26 Fe 53	0	8.52 m	7/2-	-0.65(1)	CLS	2017Mi19	PR C96 054314 (2017)
26 Fe 57	0	stable	1/2-	+0.09064(7)	N	1974Sa25	ZNat 29a 1763 (74)
26 Fe 59	0	44.5 d	3/2-	-0.3358(4)	NMR/ON(b)	1996Oh02	PR C54 554 (96)
27 Co 55	0	17.5 h	7/2-	+4.822(3)	NMR/ON	1973Ca06	NP A201 561 (73)/HFI 2 45 (76)
27 Co 56	0	77.2 d	4+	3.85(1)	NMR/ON	1977St36	JP C10 3651 (77)
				3.99(6)	NMR/ON	1986Ro28	CzJP B36 1331 (86)
27 Co 57	0	272 d	7/2-	+4.720(10)	NMR/ON	1972Ni01	JP C10 3651 (77)/Phca 57 1 (72)
				4.719(12)	NMR/ME	1974La19	ZP A270 233 (74)
27 Co 58	0	70.8 d	2+	+4.044(8)	NMR/ON	1972Ni01	Phca 57 1 (72)
				+4.040(14)	EPR	1957Do38	PR 108 60 (57)
27 Co 59	0	stable	7/2-	+4.615(25)	N	1967Wa16/1951Pr02	PR 162 301 (67)/PR 81 20 (51)

27 Co 60	0	5.271 y	5+	+3.799(8)	NMR/ON	1972Ni01	Phca 57 1 (72)
	59	10.5 m	2+	+4.40(9)	AB	L	Cf69Mntr 91 (69)
28 Ni 55	0	205 ms	7/2-	(-)0.98(3)	b-NMR	2009Be22	PR C79 064305 (09)
28 Ni 57	0	35.6 h	3/2-	-0.7975(14)	NMR/ON(b)	1996Oh02	PR C54 554 (96)
28 Ni 61	0	stable	3/2-	-0.74965(5)	N	1964Dr02	PL 11 114 (64)
28 Ni 63	0	101 y	1/2-	+0.496(5)	LRS	2017Dy01	Eu Phys J A53 13
28 Ni 65	0	2.518 h	5/2-	0.69(6)	NO/S	1976Kr09	PR C14 650 (76)
28 Ni 67	0	21 s	(1/2)-	+0.601(5)	NMR/ON(b)	2000Ri14	PRL 85 1392 (00)
29 Cu 57	0	196 ms	3/2-	+2.582(7)	CLS	2010Co01	PR C81 014314 (10)
29 Cu 58	0	3.20 s	1+	+0.571(2)	CLS	2011Vi03	PL B703 34 (2011)
29 Cu 59	0	81.5 s	3/2-	+1.8931(9)	CLS	2011Vi03	PL B703 34 (2011)
29 Cu 60	0	23.7 m	2+	+1.2200(5)	CLS	2011Vi03	PL B703 34 (2011)
29 Cu 61	0	3.34 h	3/2-	+2.1107(5)	CLS	2011Vi03	PL B703 34 (2011)
29 Cu 62	0	9.67 m	1+	-0.3800(4)	CLS	2011Vi03	PL B703 34 (2011)
29 Cu 63	0	stable	3/2-	+2.2259(4)	N	1978Lu08	ZP A288 17 (78)
29 Cu 64	0	12.7 h	1+	-0.2166(4)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 65	0	stable	3/2-	2.3844(4))	N	1978Lu08	ZP A288 17 (78)
29 Cu 66	0	5.1 m	1+	-0.2826(8)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 67	0	61.8 h	3/2-	+2.5171(6)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 68	0	30.9 s	1+	+2.3960(6)	CLS	2010VI07	PR C82 064311 (10)
	721	3.75 m	6-	+1.1561(6)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 69	0	2.85 m	3/2-	+2.8415(10)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 70	0	44.5 s	6-	+1.3681(5)	CLS	2010VI07	PR C82 064311 (10)
	101	33 s	3-	-3.3679(15)	CLS	2010VI07	PR C82 064311 (10)
	242	6.6 s	1+	+1.7799(15)	CLS	2010VI07	PR C82 064311 (10)
29 Cu 71	0	19.4 s	3/2-	+2.2772(8)	LRIS/CLS	2009Fl03	PRL 103 142501 (09)
29 Cu 72	0	6.62 s	2-	-1.3487(10)	RILIS	2010Fl02	PR C82 041302(R) (10)
29 Cu 73	0	4.2 s	3/2-	+1.7446(8)	ISLS/CLS	2009FL03	PRL 103 142501 (2009)
29 Cu 74	0	1.63 s	2-	-1.0670(12)	CLS	2017De30	PR C96 041302(R)(2017)
29 Cu 75	0	1.22 s	5/2-	+1.0069(10)	CLS	2017De30	PR C96 041302(R)(2017)
29 Cu 76	0	641 ms	3-	-1.0907(15)	CLS	2017De30	PR C96 041302(R)(2017)
29 Cu 77	0	467 ms	5/2-	+1.5963(17)	CLS	2017De30	PR C96 041302(R)(2017)
29 Cu 78	0	335 ms	(6-)	+0.238(3)	CLS	2017De30	PR C96 041302(R)(2017)
30 Zn 63	0	38.4 m	3/2-	-0.28143(5)	OD	1969La05	PR 177 1606 (69)
30 Zn 65	0	244.1 d	5/2-	+0.7684(2)	OD	1964By01	PR 134 A47 (64)
30 Zn 67	0	stable	5/2-	+0.87485(16)	OP/RD, N	1967Sp04	PL 24A 430 (67)
30 Zn 69	0	56.4 m	1/2-	+0.557(2)	CLS	2017Wr01	PL B771 385 (2017)
	439	13.7 h	9/2+	1.1605(7)	CLS	2017Wr01	PL B771 385 (2017)

30 Zn 71	0	2.45 m	1/2-	+0.551(1)	CLS	2017Wr01	PL B771 385 (2017)
	158	3.96 h	9/2+	-1.048(1)	CLS	2017Wr01	PL B771 385 (2017)
30 Zn 73	0	23.5 s	1/2-	+0.5581(5)	CLS	2017Wr01	PL B771 385 (2017)
	195	13.0 ms	5/2+	-0.8521(14)	CLS	2017Wr01	PL B771 385 (2017)
30 Zn 75	0	10.2 s	7/2+	-0.7881(9)	CLS	2017Wr01	PL B771 385 (2017)
	127	(5 s)	1/2-	+0.5576(9)	CLS	2017Wr01	PL B771 385 (2017)
30 Zn 77	0	2.08 s	7/2+	-0.9067(1)	CLS	2017Wr01	PL B771 385 (2017)
	772	1.05 s	1/2-	+0.562(2)	CLS	2017Wr01	PL B771 385 (2017)
30 Zn 79	0	0.75 s	9/2+	-1.1857(10)	CLS	2016Ya02	PRL 116 182502 (2016)
	983	>200 ms	1/2+	-1.0173(12)	CLS	2016Ya02	PRL 116 182502 (2016)
31 Ga 63	0	32.4 s	3/2-	+0.1468(5)	CLS	2012Pr11	PR C86 034329 (2012)
31 Ga 65	0	15.2 m	3/2-	+1.773(3)	CLS	2017Fa09	PR C96 044324 (2017)
31 Ga 67	0	78.3 h	3/2-	+1.8494(5)	AB	1968Eh02	PR 176 25 (68)
31 Ga 68	0	67.7 m	1+	0.01174(7)	AB	1962Eh02	PR 127 529 (62)
31 Ga 69	0	stable	3/2-	+2.01502(6)	NMR	2015An17	JCP 143 074301 (2015)
31 Ga 70	0	21.1 m	1+	+0.571(2)	CLS	2012Pr11	PR C86 034329 (2012)
31 Ga 71	0	stable	3/2-	+2.56033(9)	NMR	Jack 27Al	JCP 143 074301 (2015)
31 Ga 72	0	14.1 h	3-	-0.13214(2)	AB	1962Eh02	PR 127 529 (62)
31 Ga 73	0	4.86 h	3/2-	+0.209(2)	CLS	2010Ch16	PRL 104 252502 (10)
31 Ga 74	0	8.12 m	3- or 4-	0.00(8)	LRS	2011Ma45	PR C84 024303 (2011)
31 Ga 75	0	126 s	3/2-	+1.835(4)	CLS	2010Ch16	PRL 104 252502 (10)
31 Ga 76	0	32.6 s	(2+)	-0.945(4)	LRS	2011Ma45	PR C84 024303 (2011)
31 Ga 77	0	13.2 s	3/2-	+2.018(3)	CLS	2010Ch16	PRL 104 252502 (10)
31 Ga 78	0	5.1 s	(2+)	-1.214(5)	LRS	2011Ma45	PR C84 024303 (2011)
31 Ga 79	0	2.85 s	3/2-	+1.046(3)	CLS	2010Ch16	PRL 104 252502 (10)
31 Ga 80	0	1.9 s	6(-)	+0.036(4)	CLS	2010Ch50	PR C82 051302(R) (10)
	22.4	1.3 s	3(-)	-1.425(5)	CLS	2010Ch50	PR C82 051302(R) (10)
31 Ga 81	0	1.22 s	5/2-	+1.746(5)	CLS	2010Ch16	PRL 104 252502 (10)
32 Ge 69	0	39.0 h	5/2-	0.735(7)	AB	1970Ol02	PR C2 228 (70)
32 Ge 71	0	11.4 d	1/2-	+0.546(5)	AB, R	1966Ch02	PR 141 15 (66)/PR C1 750 (70)
32 Ge 73	0	stable	9/2+	-0.87824(5)	NMR	2006Ma97	J Phys Chem A110 11462 (2006)
32 Ge 75	0	82.8 m	1/2-	+0.509(5)	AB	1970Ol02	PR C2 228 (70)
33 As 69	0	15.2 m	5/2-	+1.622(2)	NMR/ON	2005Go44	PR C72 064316 (05)
33 As 70	0	53 m	4+	+2.1104(5)	AB	1980Ho02	ZP A294 1 (80)
33 As 71	0	65.3 h	5/2-	+1.673(2)	NMR/ON	1976He25/1976He06	HFI 2 294 (76)/NP A259 378 (76)
33 As 72	0	26 h	2-	-2.1610(6)	AB	1980Ho02	ZP A294 1 (80)
33 As 74	0	17.8 d	2-	-1.596(3)	NMR/ON	1972Ka35	NP A193 410 (72)
33 As 75	0	stable	3/2-	+1.4383(3)	N	1953Ti01/1952Je05	PR 89 595 (53)/PR 85 478 (53)

33 As 76	0	26.2 h	2-	(-)0.9023(10)	NMR/ON(b)	1999Oh01	PR C59 669 (99)
33 As 77	0	38.8 h	3/2-	+1.2940(13)	NMR/ON(b)	1999Oh01	PR C59 669 (99)
34 Se 73	0	7.15 h	9/2+	0.892(13)	NMR/ON	2001St31	HFI 133 117 (2001)
34 Se 75	0	119.8 d	5/2+	0.683(10)	NMR/ON	2001St31	Hyp Int 133 117 (2001)
34 Se 77	0	stable	1/2-	+0.53356(5)	NMR	2013Ja18	Mol Phys 111 1355 (2013)
34 Se 79	0	3.3x10^5 y	7/2+	-1.018(15)	MA	1953Ha50	PR 92 1532 (53)
35 Br 72	0	79 s	1+	0.60(10)	NO/S	1992Ba68	HFI 75 433 (92)
35 Br 74	14	46 m	4(+)	1.820(12)	NMR/ON	1992Pr06	HFI 75 275 (92)
35 Br 75	0	97 m	3/2-	+0.76(18)	NO/S	1992Gr20	PR C46 2228 (92)
35 Br 76	0	16.2 h	1-	0.5477(1)	AB	1960Li11	PR 119 1053 (60)
35 Br 77	0	57 h	3/2-	0.9731(6)	NMR/ON	1993Oh09	HFI 78 485 (93)
35 Br 78	0	6.45 m	1+	0.13(3)	NO/S	1992Pr06	HFI 75 275 (92)
35 Br 79	0	stable	3/2-	+2.1046(6)	N	1972Bl07	ZNat 27a 72 (72)
35 Br 80	0	17.7 m	1+	0.5135(6)	AB	1964Wh05	PR 136 B584 (64)
	86	4.42 h	5-	+1.3165(6)	AB	1964Wh05	PR 136 B584 (64)
35 Br 81	0	stable	3/2-	+2.2686(6)	N	1972Bl07	ZNat 27a 72 (72)
35 Br 82	0	35.3 h	5-	+1.6256(6)	AB	1959Ga12	PR 116 393 (59)
35 Br 84	0	31.8 m	2-	1.9(7)	NO/S	1992Pr06	HFI 75 275 (92)
36 Kr 75	0	4.6 m	5/2+	-0.531(4)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 77	0	74.4 m	5/2+	-0.583(3)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 79	0	35.04 h	1/2-	+0.536(2)	CFBLS	1995Ke04	NP A586 219 (95)
	130	50 s	7/2+	-0.785(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 81	0	2.3 x 10^5 y	7/2+	-0.907(2)	CFBLS	1995Ke04	NP A586 219 (95)
	191	13.1 s	1/2-	+0.586(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 83	0	stable	9/2+	-0.970730(3)	NMR	2014Mb01	Magn Res Chem 52 430 (2014)
	42	1.83 h	1/2-	+0.591(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 85	0	10.74 y	9/2+	-1.0055(4)	LRFS	1993Ca41	PR A47 1148 (93)
	305	4.48 h	1/2-	+0.632(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 87	0	76.3 m	5/2+	-1.022(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 89	0	3.15 m	3/2+	-0.330(3)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 91	0	8.57 s	5/2+	-0.583(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 93	0	1.286 s	1/2+	-0.413(2)	CFBLS	1995Ke04	NP A586 219 (95)
36 Kr 95	0	0.114 s	1/2(+)	-0.410(3)	CFBLS	1995Ke04	NP A586 219 (95)
37 Rb 75	0	19 s	3/2(-)	+0.579(1)	CLS	2015Pr05	Eur Phys J 51 23 (2015)
37 Rb 76	0	36.5 s	1(-)	-0.372552(11)	ABLS	1986Du16/1981Th04	JPPa 47 1903 (86)/PR C23 2720 (81)
37 Rb 77	0	3.8 m	3/2-	+0.65434(2)	ABLS	1986Du16/1981Th04	JPPa 47 1903 (86)/PR C23 2720 (81)
37 Rb 78	103	5.7 m	4(-)	+2.548(1)	CLS	2015Pr05	Eur Phys J 51 23 (2015)

37 Rb 79	0	23 m	5/2+	+3.3573(12)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 80	0	33.4 s	1+	-0.0833(7)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 81	0	4.57 h	3/2-	+2.0591(14)	ABLS	1981Th04	PR C23 2720 (81)
	86	30.5 m	9/2+	+5.5969(17)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 82	0	1.26 m	1+	+0.554403(16)	ABLS	1986Du16/1981Th04	JPPa 47 1903 (86)/PR C23 2720 (81)
	69	6.47 h	5-	+1.5096(11)	AB	1957Hu75	PR 107 723 (57)
37 Rb 83	0	86.2 d	5/2-	+1.4246(8)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 84	0	32.8 d	2-	-1.325(2)	ABLS	1981Th04	PR C23 2720 (81)
	464	20.3 m	6-	+0.212893(6)	ABLS	1986Du16/1981Th04	JPPa 47 1903 (86)/PR C23 2720 (81)
37 Rb 85	0	stable	5/2-	+1.35306(4)	NMR	2012An18	CPL 532 1 (2012)
37 Rb 86	0	18.64 d	2-	-1.6974(16)	ABLS	1981Th04	PR C23 2720 (81)
	556	1.02 m	(6-)	+1.8147(10)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 87	0	$5.0\ 10^{10}$y	3/2-	+2.75129(8)	NMR	2012An18	CPL 532 1 (2012)
37 Rb 88	0	17.8 m	2-	0.50751(2)	AB	1979Ek02	PS 19 516 (79)
37 Rb 89	0	15.3 m	3/2-	+2.3831(7)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 90	107	4.26 m	3-	+1.6157(6)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 91	0	58.2 s	3/2(-)	+2.1811(15)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 93	0	5.84 s	5/2-	+1.4092(16)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 94	0	2.70 s	3(-)	+1.4981(18)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 95	0	0.38 s	5/2-	+1.333(3)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 96	0	0.20 s	2(-)	+1.4655(17)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 97	0	0.17 s	3/2+	+1.840(2)	ABLS	1981Th04	PR C23 2720 (81)
37 Rb 98	270	96 ms	(3-)	+1.784(1)	CLS	2015Pr05	Eur Phys J 51 23 (2015)
38 Sr 77	0	9.0 s	5/2(+)	-0.348(4)	CFBLS	1992Li11	PR C46 797 (92)
38 Sr 79	0	2.25 m	3/2(-)	-0.474(4)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 81	0	22.3 m	1/2-	+0.543(4)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 83	0	32.4 h	7/2+	-0.8295(7)	ABLFS	1987An02	ZP A326 493 (87)
	259	5.0 s	1/2-	+0.581(4)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 85	0	64.8 d	9/2+	-1.0001(7)	ABLFS	1987An02	ZP A326 493 (87)
	239	67.6 m	1/2-	+0.599(2)	ABLFS	1987An02	ZP A326 493 (87)
38 Sr 87	0	stable	9/2+	-1.09316(11)	NMR	2013An23	CPL 588 57 (2013)
	388	2.82 h	1/2-	+0.624(4)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 89	0	50.6 d	5/2+	-1.148(2)	ABLFS	1987An02	ZP A326 493 (87)
38 Sr 91	0	9.65 h	5/2+	-0.885(2)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 93	0	7.4 m	5/2+	-0.793(2)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 95	0	23.9 s	1/2-	-0.537(2)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 97	0	0.43 s	1/2-	-0.498(2)	CFBLS	1990Bu12	PR C41 2883 (90)
38 Sr 99	0	0.269 s	3/2+	-0.261(5)	CFBLS	1991Li05	PL B256 141 (91)
39 Y 85	20	4.9 h	(9/2)+	6.2(5)	NO/S	1988Be46	HFI 43 477 (88)

39 Y 87	0	79.8 h	1/2-	-0.19(2)	CLS	2007Ch07	PL B645 133 (07)
	381	13.4 h	9/2+	+6.24(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 88	0	106.6 d	4-	-0.42(1)	CLS	2007Ch07	PL B645 133 (07)
	675	14 ms	8+	+4.88(3)	CLS	2007Ch07	PL B645 133 (07)
39 Y 89	0	stable	1/2-	-0.137298(5)	NMR	2016An22	CPL 660 127 (2016)
	909	15.7 s	9/2+	+6.37(4)	CLS	2007Ch07	PL B645 133 (07)
39 Y 90	0	64.0 h	2-	-1.628(8)	AB	1962Pe01	PR 125 284 (62)
	682	3.19 h	7+	+5.28(3)	CLS	2007Ch07	PL B645 133 (07)
39 Y 91	0	58.5 d	1/2-	0.1639(8)	AB	1962Pe21	PR 128 1740 (62)
	556	49.7m	9/2+	5.96(4)	NMR/ON	1991Be18	PR C44 104 (91)
39 Y 92	0	3.54 h	2-	-0.67(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 93	0	10.2 h	1/2-	-0.139(1)	b-NMR/ON	2004Ni21	HFI 159 239 (2004)
	758	0.82 s	9/2+	+6.04(3)	CLS	2007Ch07	PL B645 133 (07)
39 Y 94	0	18.7 m	2-	-0.24(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 95	0	10.3 m	1/2-	-0.16(3)	CLS	2007Ch07	PL B645 133 (07)
39 Y 96	1140	9.6 s	8+	+6.57(3)	CLS	2007Ch07	PL B645 133 (07)
39 Y 97	0	3.75 s	1/2-	-0.12(1)	CLS	2007Ch07	PL B645 133 (07)
	668	1.17 s	9/2+	+5.88(2)	CLS	2007Ch07	PL B645 133 (07)
	3522	142 ms	(27/2-)	+5.64(3)	CLS	2007Bi14	PL B645 330 (07)
39 Y 98	410	2.0 s	4 or 5	+ 2.98(2) or + 3.11(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 99	0	1.48 s	5/2+	+3.18(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 100	0	0.94 s	4	+2.75(1)	CLS	2010BA31	J Phys G37 105103 (10)
39 Y 101	0	0.45 s	5/2+	+3.22(2)	CLS	2007Ch07	PL B645 133 (07)
39 Y 102	0 + x	0.3 s	2 or 3	+2.34(5) or + 2.68(1)	CLS	2007Ch07	PL B645 133 (07)
40 Zr 87	0	1.68 h	9/2+	-0.894(5)	CLS	2003Th03	JP G29 2247 (03)
	336	14.0 s	1/2-	+0.641(16)	CLS	2003Th03	JP G29 2247 (03)
40 Zr 89	0	78.4 h	9/2+	-1.045(6)	CLS	2002Fo12	JP G28 L63 (02)
	588	4.16 m	1/2-	+0.794(18)	CLS	2003Th03	JP G29 2247 (03)
40 Zr 90	2319	0.8 s	5-	6.25(13)	NMR/ON	1987Ed02	NP A468 348 (87)
40 Zr 91	0	stable	5/2+	-1.3022(4)	N	1957Br26	PR 105 1929 (57)
40 Zr 95	0	64.0 d	5/2+	1.13(2)	NMR/ON	1991Be18	PR C44 104 (91)
40 Zr 97	0	16.7 h	1/2+	-0.936(5)	CLS	2003Th03	JP G29 2247 (03)
40 Zr 99	0	2.1 s	1/2+	-0.929(4)	CLS	2003Th03	JP G29 2247 (03)
40 Zr 101	0	2.3 s	(3/2+)	-0.272(8)	CLS	2003Th03	JP G29 2247 (03)
41 Nb 89	0	2.0 h	9/2+	6.216(5)	NMR/ON	1997Hi06	NP A620 317 (97)
41 Nb 90	0	14.6 h	8+	+4.946(4)	CLS	2009Ch25	PRL 102 222501 (09)
	125	18.8 s	4-	-0.018(9)	CLS	2009Ch25	PRL 102 222501 (09)
41 Nb 91	0	680 y	9/2+	+6.513(3)	CLS	2009Ch25	PRL 102 222501 (09)
	105	60.9 d	1/2-	-0.101(2)	CLS	2009Ch25	PRL 102 222501 (09)
41 Nb 92	0	3.5 x 10^7 y	7+	+5.130(4)	CLS	2009Ch25	PRL 102 222501 (09)
	135	10.15 d	2+	+6.137(4)	NMR/ON	1981Ha24	NP A365 13 (81)

41 Nb 93	0	stable	9/2+	+6.163(2)	N,O	1951Sh33, 1947Me27	PR 82 651 (51), PR 72 451 (47)
41 Nb 95	0	35.0 d	9/2+	6.141(5)	NMR/ON	1986Ed01	NP A451 46 (86)
41 Nb 96	0	23.4 h	6+	4.975(4)	NMR/ON	1985Oh08	NP A445 29 (85)
41 Nb 97	0	72.1 m	9/2+	6.153(5)	NMR/ON	1991Be18	PR C44 104 (91)
41 Nb 99	0	15.0 s	9/2+	+5.96(3)	CLS	2009Ch25	PRL 102 222501 (09)
41 Nb 101	0	7.1 s	5/2+	+3.186(2)	CLS	2009Ch25	PRL 102 222501 (09)
41 Nb 103	0	1.5 s	5/2+	+3.133(4)	CLS	2009Ch25	PRL 102 222501 (09)
42 Mo 91	0	15.5 m	9/2+	-0.931(3)	TLS	2009Ch09	PL B674 23 (09)
42 Mo 93	2425	6.85 h	21/2+	+9.93(8)	NMR/ON	1981Ha12	PR C23 2252 (81)
42 Mo 95	0	stable	5/2+	-0.9132(3)	N	1951Pr02	PR 81 20 (51)
42 Mo 97	0	stable	5/2+	-0.9324(3)	N	1951Pr02	PR 81 20 (51)
42 Mo 99	0	65.9 h	1/2+	0.375(3)	AB	1978Ru04	PS 18 209 (78)
42 Mo 103	0	67.5 s	3/2+	-0.27(2)	TLS	2009Ch09	PL B674 23 (09)
42 Mo 105	0	35.6 s	(5/2-)	-0.55(2)	TLS	2009Ch09	PL B674 23 (09)
43 Tc 93	0	2.75 h	9/2+	6.32(6)	NMR/ON	1995Hi06	ZP A350 311 (95)
43 Tc 94	0	293 m	7+	5.12(5)	NMR/ON	1995Hi06	ZP A350 311 (95)
43 Tc 95	0	20.0 h	9/2+	5.94(6)	NMR/ON	1995Hi06	ZP A350 311 (95)
43 Tc 96	0	4.28 d	7+	5.09(5)	NMR/ON	1995Hi06	ZP A350 311 (95)
43 Tc 97	0	$4.2x10^6$ y	9/2+	5.82(9)	LRS	2017Ra01	HFI 238 15 (2017)
43 Tc 99	0	$2.1x10^5$ y	9/2+	+5.678(2)	N	1952Wa02	PR 85 479 (52)
	181	3.61 ns	5/2+	3.48(4)	NMR/ON	1995Hi06	ZP A350 311 (95)
44 Ru 95	0	1.64 h	5/2+	0.861(7)	NMR/ON	1991Hi17	NP A534 339 (91)
44 Ru 97	0	2.8 d	5/2+	(-)0.787(8)	NMR/ON	1985Ed06/1980Le09	PR C32 1707 (85)/PR C21 2581 (80)
44 Ru 99	0	stable	5/2+	-0.641(5)	AB/D	1977Bu04	ZP A280 217 (77)
44 Ru 101	0	stable	5/2+	-0.718(6)	AB/D	1977Bu04	ZP A280 217 (77)
44 Ru 103	0	39.2 d	3/2+	0.206(3)	NMR/ON	1990Hi02	NP A509 541 (90)
44 Ru 105	0	4.44h	3/2+	(-)0.32(+8/-20)	NO/S	1981Lu04	ZP A299 353 (81)
45 Rh 99	65	4.7 h	9/2+	5.62(6)	NMR/ON	1995Se20	PR B51 11484 (95)
45 Rh 101	157	4.34 d	9/2+	5.43(6)	NMR/ON	1995Se20	PR B51 11484 (95)
45 Rh 102	0	206 d	2-	0.5(4)	NO/S	1975Sc09	NP A243 309 (75)
	141	3.74 y	6+	4.01(4)	NMR/ON	1995Se20	PR B51 11484 (95)
45 Rh 103	0	stable	1/2-	-0.08829(3)	N	1955So10	PR 98 1316 (55)
	40	56.1 m	7/2+	4.50(5)	NMR/ON	1995Se20	PR B51 11484 (95)
45 Rh 105	0	35.4 h	7/2+	4.41(5)	NMR/ON	1995Se20	PR B51 11484 (95)
45 Rh 106	0	30.1 s	1+	2.55(3)	NMR/ON	1990Oh01/1995Se20	PR C41 243 (90)/PR B51 11484 (95)
46 Pd 101	0	8.47 h	5/2+	(-)0.66(2)	NMR/ON	1986Ni02	NP A451 233 (86)
46 Pd 105	0	stable	5/2+	-0.642(3)	N	1964Se13	PR 136 A1119 (64)

47 Ag 97	0	25.5 s	(9/2+)	+6.13(12)	GCLS	2014Fe01	PL B728 191 (2014)
47 Ag 98	0	47.5 s	5 or 6	4.57(7) or 4.64(7)	GCLS	2014Fe01	PL B728 191 (2014)
47 Ag 99	0	124 s	(9/2+)	+5.81(3)	GCLS	2014Fe01	PL B728 191 (2014)
47 Ag 100	0	2.01 m	5+	+4.37(3)	GCLS	2014Fe01	PL B728 191 (2014)
47 Ag 101	0	11.1 m	9/2+	+5.619(11)	CLS	1989Di12	NP A503 331 (89)
47 Ag 102	0	12.9 m	5+	4.6(7)	NO/S	1985Va06/1983Va09	HFI 22 483 (85)/NP A396 115c (83)
	9	7.7 m	2+	4.1(3)	AB	1974Gr10	PR C9 2028(74)
47 Ag 103	0	65.7 m	7/2+	4.426(2)	CLS	1989Di12	NP A503 331 (89)
47 Ag 104	0	69 m	5+	3.914(3)	CLS	1989Di12	NP A503 331 (89)
	7	33 m	2+	3.686(3)	NMR/ON	2010Go08	PR C81 054323 (2010)
47 Ag 105	0	41.3 d	1/2-	0.1013(10)	AB	1963Ew02	PR 129 1617 (63)
	25	7.2 m	7/2+	4.408(13)	CLS	1989Di12	NP A503 331 (89)
47 Ag 106	0	24 m	1+	+2.8(2)	AB	1974Gr10	PR C9 2028 (1974)
	90	8.3 d	6+	+3.704(4)	CLS	1989DI12	NP A503 331 (89)
47 Ag 107	0	stable	1/2-	-0.11352(5)	N	1974Sa25	ZNat 29a 1763 (74)
	93	44.3 s	7/2+	+4.392(5)	NMR/ON	1985Ed01	PR C31 190 (85)
47 Ag 108	0	2.4 m	1+	2.6838(16)	b-NMR	1976Wi03	NP A261 261 (76)
	109	438 y	6+	3.58(2)	O	1975Fi07	ZP A274 79 (75)
47 Ag 109	0	stable	1/2-	0.13051(5)	N	1974Sa25	ZNat 29a 1763 (74)
	88	39.6 s	7/2+	4.394(6)	NMR/ON	1985Ed01/1971St09	PR C31 190 (85)/CJP 49 906 (71)
47 Ag 110	0	24.6 s	1+	2.7225(14)	b-NMR/AB	1976Wi03	NP A261 261 (76)/JP A2 658 (69)
	118	250 d	6+	+3.602(4)	AB/D	1967Sc04	PR 154 1142 (67)
47 Ag 111	0	7.45 d	1/2-	-0.146(2)	AB	1956Wo27	PPS 69A 581 (56)
47 Ag 112	0	3.13 h	2(-)	0.0547(5)	AB	1964Ch06	PR 133 B1138 (64)
47 Ag 113	0	5.37 h	1/2-	0.159(2)	AB	1964Ch06	PR 133 B1138 (64)
48 Cd 101	0	1.36 m	5/2+	-0.8970(4)	CLS	2018Yo07	PR C98 011303(R) 2017
48 Cd 103	0	7.3 m	5/2+	-0.8486(4)	CLS	2018Yo07	PR C98 011303(R) 2017
48 Cd 105	0	56 m	5/2+	-0.7382(4)	CLS	2018Yo07	PR C98 011303(R) 2017
48 Cd 107	0	6.50 h	5/2+	-0.6141(3)	OP/RD	1972Sp09/1963By02	PL 42A 273 (72)/PR 132 1181 (63)
48 Cd 109	0	461 d	5/2+	-0.8266(4)	OP/RD	1972Sp09	PL 42A 273 (72)
48 Cd 111	0	stable	1/2+	-0.5940(3)	OP/RD	1972Sp09	PL 42A 273 (72)
	396	48.5 m	11/2-	-1.1036(5)	CLS//OP/RD	2013Yo02/1969La06	PRL 110 192501 (2013)/PR 177 1615 (69)
48 Cd 113	0	8 x 10^{15} y	1/2+	-0.6213(3)	OP/RD	1972Sp09	PL 42A 273 (72)
	264	14.1 y	11/2-	-1.0883(3)	OP/RD	1969Ch07	PL 29A 103 (69)
48 Cd 115	0	53.5 h	1/2+	-0.6483(2)	OP/RD	1969Ch07	PL 29A 103 (69)
	181	44.6 d	11/2-	-1.0394(6)	OP/RD	1969Ch07	PL 29A 103 (69)
48 Cd 117	0	2.49 h	1/2+	-0.7425(4)	CLS	2013Yo02	PRL 110 192501 (2013)
	136	3.36 h	11/2-	-0.9961(5)	CLS	2013Yo02	PRL 110 192501 (2013)
48 Cd 119	0	2.69 m	1/2+	-0.9188(4)	CLS	2013Yo02	PRL 110 192501 (2013)
	147	2.20 m	11/2-	-0.9628(5)	CLS	2013Yo02	PRL 110 192501 (2013)
48 Cd 121	0	13.5 s	3/2+	+0.6260(7)	CLS	2013Yo02	PRL 110 192501 (2013)
	215	8.3 s	11/2-	-1.0085(6)	CLS	2013Yo02	PRL 110 192501 (2013)

48 Cd 123	0	2.10 s	3/2+	+0.7885(7)	CLS	2013Yo02	PRL 110 192501 (2013)
	317	1.82 s	11/2-	-1.0000(6)	CLS	2013Yo02	PRL 110 192501 (2013)
48 Cd 125	0	0.68 s	3/2+	+0.8591(7)	CLS	2013Yo02	PRL 110 192501 (2013)
	0 + x	0.48 s	11/2-	-0.9333(4)	CLS	2013Yo02	PRL 110 192501 (2013)
48 Cd 127	0	0.37 s	3/2+	+0.8771(8)	CLS	2013Yo02	PRL 110 192501 (2013)
	0 + x	-	11/2-	-0.8690(5)	CLS	2013Yo02	PRL 110 192501 (2013)
48 Cd 129	0	154 ms	11/2-	-0.7052(6)	CLS	2013Yo02	PRL 110 192501 (2013)
	0 + x	146 ms	3/2+	+0.8469(9)	CLS	2013Yo02	PRL 110 192501 (2013)
49 In 104	0	1.7 m	5+	+4.43(2)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 105	0	5.07 m	9/2+	+5.667(5)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 106	0	6.2 m	7+	+4.908(7)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 107	0	32.4 min	9/2+	+5.577(8)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 108	0	58 m	7+	+4.554(3)	CFBLS	1987Eb02	NP A464 9 (87)
	30	40 m	2+	+4.928(5)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 109	0	4.2 h	9/2+	+5.530(4)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 110	0	4.9 h	7+	+4.706(8)	CFBLS	1987Eb02	NP A464 9 (87)
	62	69.1 m	2+	+4.365(4)	AB	L	Th Casserb (68)
49 In 111	0	2.83 d	9/2+	+5.495(7)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 112	0	14.9 m	1+	+2.82(3)	AB	L	Th68 Casserb (68)
	157	20.6 m	4+	+5.219(4)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 113	0	stable	9/2+	+5.5208(4)	NMR	2015An17	JCP 143 074301 (2015)
	392	99.5 m	1/2-	-0.21043(3)	AB	1960Ch08	PR 118 1578 (60)
49 In 114	0	71.9 s	1+	2.813(14)	NMR/ON	1982Nu02	PR C26 1702 (82)
	190	49.5 d	5+	+4.646(5)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 115	0	$4.4x10^{14}$ y	9/2+	+5.5326(4)	NMR	2015An17	JCP 143 074301 (2015)
	336	4.49 h	1/2-	-0.24362(5)	AB	1962Ca14	CJP 40 931 (62)
49 In 116	0	14.1 s	1+	2.7826(8)	b-NMR	1972La22	ZP 252 242 (72)
	127	54.3 m	5+	+4.428(15)	CFBLS	1987Eb02	NP A464 9 (87)
	290	2.18 s	8-	+3.210(11)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 117	0	42 m	9/2+	+5.511(4)	CFBLS	1987Eb02	NP A464 9 (87)
	315	1.93 h	1/2-	-0.25136(4)	AB	1968Mu04	CJP 46 177 (68)
49 In 118	~60	4.45 m	5+	+4.225(9)	CFBLS	1987Eb02	NP A464 9 (87)
	~200	8.5 s	8-	+3.316(11)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 119	0	2.4 m	9/2+	+5.507(10)	CFBLS	1987Eb02	NP A464 9 (87)
	311	18 m	1/2-	-0.319(5)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 120	0 + x	47.3 s	8-	+3.687(4)	CFBLS	1987Eb02	NP A464 9 (87)
	(70)	46.2 s	5+	+4.289(5)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 121	0	23.1 s	9/2+	+5.494(5)	CFBLS	1987Eb02	NP A464 9 (87)
	314	3.9 m	1/2-	-0.354(4)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 122	(40)	10.3 s	5+	+4.312(5)	CFBLS	1987Eb02	NP A464 9 (87)
	-262	10.8 s	8-	+3.776(6)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 123	0	6.17 s	9/2+	+5.483(7)	CFBLS	1987Eb02	NP A464 9 (87)
	327	47.4 s	1/2-	-0.399(4)	CFBLS	1987Eb02	NP A464 9 (87)
49 In 124	0	3.12 s	3+	+4.037(11)	CFBLS	1987Eb02	NP A464 9 (87)
	(<50)	3.7 s	8-	+3.882(9)	CFBLS	1987Eb02	NP A464 9 (87)

49 In 125	0	2.36 s	9/2+	+5.494(9)	CFBLS	1987Eb02	NP A464 9 (87)	
	360	12.2 s	1/2-	-0.432(4)	CFBLS	1987Eb02	NP A464 9 (87)	
49 In 126	0	1.53 s	3+	+4.028(11)	CFBLS	1987Eb02	NP A464 9 (87)	
	(102)	1.64 s	8-	+4.055(4)	CFBLS	1987Eb02	NP A464 9 (87)	
49 In 127	0	1.09 s	9/2+	+5.514(8)	CFBLS	1987Eb02	NP A464 9 (87)	
50 Sn 109	0	18.0 m	5/2+	-1.078(6)	CFBLS	1987Eb01	ZP A326 121 (87)	
50 Sn 111	0	35.3 m	7/2+	+0.607(4)	CFBLS	1987Eb01	ZP A326 121 (87)	
50 Sn 113	0	115 d	1/2+	-0.8777(8)	ABLFS	1986An24	PR C34 1052 (86)	
50 Sn 115	0	stable	1/2+	-0.9174(4)	N	1950Pr51	PR 79 35 (50)	
50 Sn 117	0	stable	1/2+	-0.9995(5)	N	1950Pr51	PR 79 35 (50)	
	315	14.0 d	11/2-	-1.3937(12)	ABLFS	1986An24	PR C34 1052 (86)	
50 Sn 119	0	stable	1/2+	-1.0459(5)	N	1950Pr51	PR 79 35 (50)	
	90	293.1 d	11/2-	-1.40(8)	ME	1972Gu09	PL 40A 297 (72)	
50 Sn 121	0	27.0 y	3/2+	+0.6969(11)	ABLFS	1986An24	PR C34 1052 (86)	
	6.3	43.9 y	11/2-	-1.3859(11)	ABLFS	1986An24	PR C34 1052 (86)	
50 Sn 123	0	129 d	11/2-	-1.3682(11)	ABLFS	1986An24	PR C34 1052 (86)	
50 Sn 125	0	9.64 d	11/2-	-1.346(2)	ABLFS	1986An24	PR C34 1052 (86)	
	28	9.5 m	3/2+	+0.763(3)	ABLFS	2005Le34	PR C72 034305 (05)	
50 Sn 127	0	2.1 h	11/2-	-1.327(7)	ABLFS	2005Le34	PR C72 034305 (05)	
	5	4.13 m	3/2+	+0.756(4)	ABLFS	2005Le34	PR C72 034305 (05)	
50 Sn 129	0	2.23 m	3/2+	+0.753(3)	ABLFS	2005Le34	PR C72 034305 (05)	
	35	6.9 m	11/2-	-1.295(5)	ABLFS	2005Le34	PR C72 034305 (05)	
50 Sn 130	1947	1.7 m	7-	-0.381(3)	ABLFS	2005Le34	PR C72 034305 (05)	
50 Sn 131	0	56 s	3/2+	+0.746(4)	ABLFS	2005Le34	PR C72 034305 (05)	
	242	58.4 s	11/2-	-1.274(5)	ABLFS	2005Le34	PR C72 034305 (05)	
51 Sb 114	0	3.49 m	3+	1.72(8)	NO/S	1993Bo46	HFI 78 133 (93)	
51 Sb 115	0	32.1 m	5/2+	+3.46(1)	AB	1968Ja05	PR 175 65 (68)	
51 Sb 116	0	15.8 m	3+	2.715(9)	NMR/ON	1986Gr16	PL 177B 159 (86)	
	383	60.3 m	8-	2.59(22)	NO/S	1993Bo46	HFI 78 133 (93)	
51 Sb 117	0	2.80 h	5/2+	+3.43(6)	AB	1974Ek01	NP A226 219 (74)	
51 Sb 118	0	3.6 m	1+	(+)2.46(7)	AB	1968Ja05	PR 175 65 (68)	
	250	5.0 h	8-	2.32(4)	NMR/ON	1974Ca06	NP A221 1 (74)	
51 Sb 119	0	38.2 h	5/2+	+3.45(1)	AB	1968Ja05	PR 175 65 (68)	
51 Sb 120	0	15.9 m	1+	2.3(2)	AB	1968Ja05	PR 175 65 (68)	
	0 + x	5.76 d	8-	2.34(3)	NMR/ON	1974Ca06	NP A221 1 (74)	
51 Sb 121	0	stable	5/2+	+3.3580(16)	N	1951Pr02	PR 81 20 (51)	
51 Sb 122	0	2.72 d	2-	-1.90(2)	NO/D	1958Pi45	PR 112 935 (58)	
51 Sb 123	0	stable	7/2+	+2.5457(12)	N	1951Pr02	PR 81 20 (51)	
51 Sb 124	0	60.2 d	3-	1.20(2)	NMR/ON	1974Ca06	NP A221 1 (74)	
51 Sb 125	0	2.76 y	7/2+	+2.63(4)	NMR/ON	1974Ca06	NP A221 1 (74)	
51 Sb 126	0	12.4 d	(8)-	1.28(7)	NO/S	1972Kr15	PR C6 2268 (72)	

51 Sb 127	0	3.85 d	7/2+	2.70(4)	NMR/ON	1996Li01	PR C53 124 (96)
51 Sb 128	0	9.05 h	8-	1.3(2)	NO/S	1972Kr15	PR C6 2268 (72)
51 Sb 129	0	4.37 h	7/2+	2.79(4)	NMR/ON	1997St06/1996Li01	PRL 78 820 (97)/PR C53 124 (96)
51 Sb 131	0	23.0 m	7/2+	2.89(4)	NMR/ON	1997St06	PRL 78 820 (97)
51 Sb 133	0	2.34 m	7/2+	3.00(4)	NMR/ON	1997St06	PRL 78 820 (97)
52 Te 119	0	16.1 h	1/2+	0.25(5)	AB	1965Ad03	ArkF 30 111 (65)
	261	4.70 d	11/2-	0.894(6)	NMR/ON	1987Ni11	PR C36 2069 (87)
52 Te 121	294	164 d	11/2-	0.895(10)	NMR/ON	1987Ni11	PR C36 2069 (87)
52 Te 123	0	>9x10^{16} y	1/2+	-0.7358(3)	N	1977Bu29/1953We51	ZNat 32a 1263 (77)/PR 89 923 (53)
	247	119.2 d	11/2-	-0.927(8)	NMR/ON	1987Ni11/1973Si26	PR C36 2097 (87)/NP A210 307 (73)
52 Te 125	0	stable	1/2+	-0.8870(5)	N	1977Bu29	ZNat 32a 1263 (77)
	145	57.4 d	11/2-	-0.985(6)	NMR/ON	1980Ge02	PR C21 439 (80)
52 Te 127	0	9.35 d	3/2+	0.635(4)	NMR/ON	1979Ge04	PR C20 1171 (79)
	88	106 d	11/2-	-1.041(6)	NMR/ON	1980Ge02	PR C21 439 (80)
52 Te 129	0	69.6 m	3/2+	0.702(4)	NMR/ON	1979Ge04	PR C20 1171 (79)
	106	33.6 d	11/2-	-1.091(7)	NMR/ON	1979Ge04	PR C20 1171 (79)
52 Te 131	0	25.0 m	3/2+	0.696(9)	NMR/ON	1979Ge04	PR C20 1171 (79)
	182	33 3 h	11/2-	-1.123(7)	NMR/ON	1998Wh05	NP A640 322 (98)
52 Te 133	0	12.5 m	3/2+	+0.85(2)	CLS	2006SI40	HFI 171 173 (06)
	334	55.4 m	11/2-	-1.129(7)	NMR/ON	1998Wh05	NP A640 322 (98)
52 Te 135	0	19.0 s	7/2-	-0.69(5)	CLS	2006SI40	HFI 171 173 (06)
53 I 117	0	2.22 m	(5/2)+	3.1(2)	NO/S	1986Gr06	PL 173B 115 (86)
53 I 118	0	13.7 m	2-	2.0(2)	NO/S	1986Gr06	PL 173B 115 (86)
	104 + x	8.5 m	(7-)	4.2(2)	NO/S	1986Gr06	PL 173B 115 (86)
53 I 119	0	19 m	5/2+	(+)2.9(1)	NO/S	1986Gr06	PL 173B 115 (86)
53 I 120	0	81.6 m	2-	1.23(3)	NO/S	1986Gr06	PL 173B 115 (86)
	~930	53 m	(7-)	4.2(2)	NO/S	1986Gr06	PL 173B 115 (86)
53 I 121	0	2.12 h	5/2-	2.3(1)	NO/S	1986Gr06	PL 173B 115 (86)
53 I 122	0	3.63 m	1+	+0.94(3)	NO/S	1986Gr06/1988As06	PL 173B 115 (86)/HFI 43 489 (88)
53 I 123	0	13.2 h	5/2+	2.818(7)	NMR/ON	1979Sc13	NP A323 1 (79)
53 I 124	0	4.18 d	2-	1.446(4)	NMR/ON	1992Oh01	PR C45 162 (92)
53 I 125	0	59.4 d	5/2+	2.821(5)	NMR/ON	1979Sc13	NP A323 1 (79)
53 I 126	0	12.9 d	2-	1.438(4)	NMR/ON	1992Oh01	PR C45 162 (92)
53 I 127	0	stable	5/2+	+2.8087(14)	N, O	1951Ya03/1939Sc16	PR 82 750 (51)/ZP 112 199 (39)
53 I 129	0	1.57x10^{7} y	7/2+	+2.6165(14)	N	1951Wa12	PR 82 97 (51)
53 I 130	0	12.36 h	5+	3.349(7)	NMR/ON	1992Oh01	PR C45 162 (92)
53 I 131	0	8.03 d	7/2+	+2.738(1)	AB	1960Li13	PR 119 2022 (60)
53 I 132	0	2.30 h	4+	3.088(7)	AB	L	BAPS 5 504 (60)
53 I 133	0	20.8 h	7/2+	+2.856(5)	AB	L	UCRL 9850 (61)

53 I 135	0	6.58 h	7/2+	(+)2.940(2)	NMR/ON	1998Wh04	NP A644 277 (98)
54 Xe 117	0	1.02 m	5/2+	-0.5938(15)	CFBLS	L	PC Neugart (90)
54 Xe 119	0	5.8 m	5/2+	-0.6542(15)	CFBLS	L	PC Neugart (90)
54 Xe 121	0	40.1 m	5/2+	-0.701(3)	CFBLS	L	PC Neugart (90)
54 Xe 123	0	2.08 h	1/2+	-0.150(3)	CFBLS	L	PC Neugart (90)
54 Xe 125	0	16.9 h	1/2+	-0.269(3)	CFBLS	L	PC Neugart (90)
	253	57 s	9/2-	-0.7453(8)	CFBLS	L	PC Neugart (90)
54 Xe 127	0	36.3 d	1/2+	-0.5033(11)	CFBLS	L	PC Neugart (90)
	297	1.15 m	9/2-	-0.8844(10)	CFBLS	L	PC Neugart (90)
54 Xe 129	0	stable	1/2+	-0.777961(16)	NMR	2015Ma72	Magn Res Chem 53 273 (2015)
	236	8.88 d	11/2-	-0.891170(10)	N, OP/RD	1986Ki16	PR C34 1974 (86)
54 Xe 131	0	stable	3/2+	+0.691845(7)	NMR	2015Ma72	Magn Res Chem 53 273 (2015)
	164	11.8 d	11/2-	-0.993989(12)	N, OP/RD	1986Ki16	PR C34 1974 (86)
54 Xe 133	0	5.25 d	3/2+	+0.81335(7)	N, OP/RD	1986Ki16	PR C34 1974 (86)
	233	2.20 d	11/2-	-1.08241(15)	N, OP/RD	1986Ki16	PR C34 1974 (86)
54 Xe 135	0	9.14 h	3/2+	+0.9032(7)	CFBLS	L	PC Neugart (90)
	527	15.3 m	11/2-	-1.1036(14)	CFBLS	L	PC Neugart (90)
54 Xe 137	0	3.82 m	7/2-	-0.9704(10)	CFBLS	1989Bo03	PL B216 7 (89)
54 Xe 139	0	39.7 s	3/2-	-0.3040(16)	CFBLS	1989Bo03	PL B216 7 (89)
54 Xe 141	0	1.73 s	5/2(-)	+0.010(3)	CFBLS	1989Bo03	PL B216 7 (89)
54 Xe 143	0	0.51 s	5/2-	-0.460(2)	CFBLS	1989Bo03	PL B216 7 (89)
55 Cs 118	0	14 s	2	+3.870(5)	ABLS	1987Co19	NP A468 1 (87)
	0 + x	17 s	(6-)	5.4(11)	NO/S	1987Sh12	PR C36 413 (87)
55 Cs 119	0	43 s	9/2+	+5.45(3)	ABLS	1981Th06	NP A367 1 (81)
	0 + x	30.4 s	3/2+	+0.837(5)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 120	0	61.3 s	2+	+3.86(2)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 121	0	155 s	3/2+	+0.769(4)	ABLS	1981Th06	NP A367 1 (81)
	68	122 s	9/2+	+5.40(3)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 122	0	21 s	1+	0.133(2)	AB	1977Ek02	NP A292 144 (77)
	~140	3.7 m	8-	+4.76(2)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 123	0	5.9 m	1/2+	+1.375(7)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 124	0	31 s	1+	+0.672(3)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 125	0	47 m	1/2+	+1.407(7)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 126	0	1.64 m	1+	+0.776(4)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 127	0	6.2 h	1/2+	+1.457(7)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 128	0	3.6 m	1+	+0.972(5)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 129	0	32.1 h	1/2+	+1.489(8)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 130	0	29.2 m	1+	+1.458(7)	ABLS	1981Th06	NP A367 1 (81)
	163	3.46 m	5-	+0.628(4)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 131	0	9.69 d	5/2+	+3.536(3)	AB/D	1965Wo05	PR 140 B1483 (65)
55 Cs 132	0	6.48 d	2+	+2.219(7)	OL	1975Ac01	NP A248 157 (75)

55 Cs 133	0	stable	7/2+	+2.5778(14)	OP/RD	1973Wh01	PR A7 1178 (73)
55 Cs 134	0	2.06 y	4+	+2.9893(14)	AB/D	1957St11	PR 105 590 (57)
	139	2.91 h	8-	+1.0959(6)	AB/D	1962Co14	PR 127 517 (62)
55 Cs 135	0	2.3 x 10^6 y	7/2+	+2.7283(13)	AB/D	1957St11	PR 105 590 (57)
	1633	53 m	19/2-	+2.18(1)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 136	0	13.2 d	5+	+3.705(15)	OL	1975Ac01	NP A248 157 (75)
	0+x	19 s	8-	+1.317(7)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 137	0	30.1 y	7/2+	+2.8374(14)	AB	1957St11	PR 105 590 (57)
55 Cs 138	0	33.4 m	3-	+0.699(4)	ABLS	1981Th06	NP A367 1 (81)
	80	2.9 m	6-	+1.710(9)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 139	0	9.3 m	7/2+	+2.688(4)	CFBLS	1979Bo01	ZP A289 227 (79)
55 Cs 140	0	63.7 s	1-	+0.134(1)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 141	0	24.8 s	7/2+	+2.431(10)	CFBLS	1979Bo01	ZP A289 227 (79)
55 Cs 143	0	1.79 s	3/2+	+0.869(4)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 144	0	0.99 s	1(-)	-0.545(3)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 145	0	0.59 s	3/2+	+0.783(4)	ABLS	1981Th06	NP A367 1 (81)
55 Cs 146	0	0.32 s	1-	-0.514(2)	ABLS	1987Co19	NP A468 1 (87)
56 Ba 121	0	30 s	5/2(+)	+0.660(1)	CFBLS	1988We14	PL 211B 272 (88)
56 Ba 123	0	2.7 m	5/2+	-0.680(1)	CFBLS	1988We14	PL 211B 272 (88)
				-0.69(2)	CFBLS	1983Mu12	NP A403 234 (83)
56 Ba 125	0	3.5 m	1/2+	+0.177(12)	CFBLS	1983Mu12	NP A403 234 (83)
	0 + x	-	5/2+	0.1736(10)	CFBLS	1992Da06	JP G18 L67 (92)
56 Ba 127	0	12.7 m	1/2+	+0.0834(10)	CFBLS	1992Da06	JP G18 L67 (92)
	80	1.9 s	7/2-	-0.7227(5)	CFBLS	1992Da06	JP G18 L67 (92)
56 Ba 129	0	2.23 h	1/2+	-0.398(16)	ABLFS, R	1983Mu12/1979Be25	NP A403 234 (83)/ZP A291 219 (79)
	8.4	2.14 h	7/2+	+0.930(17)	ABLFS, R	1983Mu12/1979Be25	NP A403 234 (83)/ZP A291 219 (79)
56 Ba 130	2475	9.4 ms	8-	-0.04(3)	CLS	2002Mo31	PL B547 200 (02)
56 Ba 131	0	11.5 d	1/2+	0.7083(2)	TIS	1987Kn10	EPL 4 1361 (87)
	188	14.6 m	9/2-	-0.87(2)	CFBLS	1983Mu12	NP A403 234 (83)
56 Ba 133	0	10.55 y	1/2+	0.7719(2)	TIS	1987Kn10	EPL 4 1361 (87)
	288	38.9 h	11/2-	-0.91(5)	ABLFS	1983Mu12/1979DbE25	NP A403 234 (83)/ZP A291 219 (79)
56 Ba 135	0	stable	3/2+	+0.8381(2)	NMR	2013An23	CPL 588 57 (2013)
	268	28.7 h	11/2-	-1.001(15)	ABLFS	1983Mu12/1979DbE25	NP A403 234 (83)/ZP A291 219 (79)
56 Ba 137	0	stable	3/2+	+0.9375(2)	NMR	2013An23	CPL 588 57 (2013)
	662	2.55 m	11/2-	-0.99(3)	ABLFS	1983Mu12/1979DbE25	NP A403 234 (83)/ZP A291 219 (79)
56 Ba 139	0	83.1 m	7/2-	-0.973(5)	CFBLS	1988We07	ZP A329 407 (88)
56 Ba 141	0	18.3 m	3/2-	-0.337(5)	CFBLS	1988We07	ZP A329 407 (88)
56 Ba 143	0	14.5 s	5/2-	+0.443(11)	CFBLS	1988We07	ZP A329 407 (88)
56 Ba 145	0	4.31 s	5/2-	-0.285(7)	CFBLS	1988We07	ZP A329 407 (88)
57 La 135	0	19.5 h	5/2+	+3.70(9)	CFBLS	2003Il03	PR C68 054328 (03)
57 La 137	0	6 x 10^4 y	7/2+	+2.696(6)	O	1972Fi19	ZP 254 127 (72)

57 La 138	0	1.0×10^{11} y	5+	+3.7084(2)	NMR	2016An22	CPL 660 127 (2016)
57 La 139	0	stable	7/2+	+2.7791(2)	NMR	2016An22	CPL 660 127 (2016)
57 La 140	0	40.3 h	3-	+0.730(15)	AB	L	Cf69Mont 91 (69)
58 Ce 137	0	9.0 h	3/2+	0.96(4)	NMR/ON	1991Mu06	JPJa 60 845 (91)
	254	34.4 h	11/2-	1.01(4)	NMR/ON	1991Mu06	JPJa 60 845 (91)
58 Ce 139	0	137.6 d	3/2+	1.06(4)	NMR/ON	1991Mu06	JPJa 60 845 (91)
58 Ce 141	0	32.5 d	7/2-	1.09(4)	NMR/ON	1983Va36	HFI 15 325 (83)
58 Ce 143	0	33.0 h	3/2-	0.43(1)	NMR/ON	2002Ta01	PR C65 017301 (01)
59 Pr 141	0	stable	5/2+	+4.266(3)	OD	1982Ma31	PRL 49 636 (82)
59 Pr 142	0	19.1 h	2-	+0.234(1)	AB	L	PCan 29n4 47 (73)/BAPS 15 628 (70)
	4	14.6 m	5-	2.2(1)	AB	1973AnZO	PCan 29n4 47 (73)
59 Pr 143	0	13.57 d	7/2+	+2.695(5)	CFBLS	1994Ii01	PR C50 661 (94)
60 Nd 135	0	12.4 m	9/2-	-0.78(3)	LRIMS	1992Le09	JP G18 1177 (92)
60 Nd 137	0	38 m	1/2+	-0.632(5)	LRIMS	1992Le09	JP G18 1177 (92)
60 Nd 139	0	29.7 m	3/2+	+0.905(7)	LRIMS	1992Le09	JP G18 1177 (92)
60 Nd 141	0	2.49 h	3/2+	+1.010(9)	LRIMS	1992Le09	JP G18 1177 (92)
60 Nd 143	0	stable	7/2-	-1.065(5)	AB/D	1965Sm04	PPS 86 1249 (65)
60 Nd 145	0	stable	7/2-	-0.656(4)	AB/D	1965Sm04	PPS 86 1249 (65)
60 Nd 147	0	11.0 d	5/2-	0.554(10)	AB	L	BAPS 15 769 (70)
60 Nd 149	0	1.73 h	5/2-	0.351(10)	AB	L	BAPS 15 769 (70)
61 Pm 138	0	3.5 m	(3+)	3.2(9)	NO/S	1992Si22	HFI 75 471 (92)
61 Pm 143	0	265 d	5/2+	3.8(5)	NO/S	1963Gr10	PR 130 1100 (63)
61 Pm 144	0	363 d	5-	1.69(14)	NO/S	1961Sh02	PR 121 558 (61)
61 Pm 145	0	17.7 y	5/2+	+3.80(16)	CFBLS	1992Al03	JP B25 571 (92)
61 Pm 147	0	2.623 y	7/2+	+2.58(7)	O	1966Re04	PR 141 1123 (66)
61 Pm 148	0	5.37 d	1-	+2.1(2)	AB	1965Al10	PR 138 B1356 (65)
	138	41.3 d	6-	1.8(2)	NO/S	1963Gr10	PR 130 1100 (63)
61 Pm 149	0	53.1 h	7/2+	3.3(5)	NO/S	1960Ch15/1963Gr10	PRS 259A 377 (60)/PR 130 1100 (63)
61 Pm 151	0	28.4 h	5/2+	1.8(2)	AB	1963Bu14	PR 132 723 (63)
62 Sm 139	0	2.57 m	1/2+	-0.53(2)	LRIMS	1992Le09	JP G18 1177 (92)
62 Sm 141	0	10.2 m	1/2+	-0.74(2)	LRIMS	1992Le09	JP G18 1177 (92)
	176	22.6 m	11/2-	-0.84(2)	LRIMS	1992Le09	JP G18 1177 (92)
62 Sm 143	0	8.75 m	3/2+	+1.01(2)	LRIMS	1992Le09	JP G18 1177 (92)
62 Sm 145	0	340 d	7/2-	-1.120(11)	LRFS	1990En01	JP G16 105 (90)
62 Sm 147	0	1.1×10^{11} y	7/2-	-0.8090(14)	ENDOR	1972Ch27	PR B5 3387 (72)
62 Sm 149	0	stable	7/2-	-0.6677(11)	ENDOR	1972Ch27	PR B5 3387 (72)
62 Sm 151	0	90 y	5/2-	-0.3605(6)	CFBLS	1981Do07	ZP A302 359 (81)

62 Sm 153	0	46.3 h	3/2+	-0.021(3)	LRFS	1990En01	JP G16 105 (90)
63 Eu 138	0	12.1 s	(6-)	5.3(7)	NO/S	1992Si22	HFI 75 471 (92)
63 Eu 139	0	17.9s	(11/2-)	6.1(8)	NO/S	1992Si22	HFI 75 471 (92)
63 Eu 140	0	1.51 s	1+	+1.362(13)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 141	0	40.7 s	5/2+	+3.486(8)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 142	0	2.4 s	1+	+1.532(19)	CFBLS	1985Ah02	ZP A321 35 (85)
	0 + x	1.22 m	8-	+2.971(11)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 143	0	2.59 m	5/2+	+3.664(8)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 144	0	10.2 s	1+	+1.888(13)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 145	0	5.93 d	5/2+	+3.983(7)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 146	0	4.61 d	4-	+1.422(11)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 147	0	24.1 d	5/2+	+3.715(8)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 148	0	54.5 d	5-	+2.334(10)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 149	0	93.1 d	5/2+	+3.556(6)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 150	0	36.9 y	5-	+2.702(11)	CFBLS	1985Ah02	ZP A321 35 (85)
63 Eu 151	0	$>1.7x10^{18}$ y	5/2+	+3.4635(25)	AB	1965Ev08	PRS 289A 114 (65)
63 Eu 152	0	13.52 y	3-	-1.9354(17)	CFBLS	L	Cf93Bern 209(93)
63 Eu 153	0	stable	5/2+	+1.5294(11)	AB	1965Ev08	PRS 289A 114 (65)
63 Eu 154	0	8.60 y	3-	-2.000(6)	EPR	1957Ab05	PR 108 58 (57)
63 Eu 155	0	4.75 y	5/2+	+1.516(2)	ABLFS	2000Ga35	EurPJ D11 341 (00)
63 Eu 157	0	15.2 h	5/2+	+1.50(2)	CFBLS	1990Al34	ZP A337 257 (90)
63 Eu 158	0	45.9 m	(1-)	+1.44(2)	CFBLS	1990Al34	ZP A337 257 (90)
63 Eu 159	0	18.1 m	5/2+	+1.38(2)	CFBLS	1990Al34	ZP A337 257 (90)
64 Gd 145	0	23 m	1/2+	-0.74(5)	LS	2005Ba64	PR C72 017301 (05)
	749	85 s	11/2-	-1.0(2)	LS	2005Ba64	PR C72 017301 (05)
64 Gd 147	0	38.1 h	7/2-	1.02(9)	NO/S	1987Kr11	HFI 34 69 (87)
64 Gd 149	0	9.28 d	7/2-	0.88(4)	NO/S	1987Kr11	HFI 34 69 (87)
64 Gd 151	0	123.9 d	7/2-	0.77(6)	NO/S	1987Be33	HFI 34 119 (87)
64 Gd 153	0	240.4 d	3/2-	0.38(8)	NO/S	1985Al21	NP A445 189 (86)
64 Gd 155	0	stable	3/2-	-0.2591(4)	ENDOR	1978Va24	JP C11 203 (78)
64 Gd 157	0	stable	3/2-	-0.3398(6)	ENDOR	1978Va24	JP C11 203 (78)
64 Gd 159	0	18.5 h	3/2-	-0.44(3)	NO/S	1971Kr19	PR C4 1942 (71)
65 Tb 147	0	1.64 h	1/2+	+1.71(5)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 148	0	60 m	2-	-1.76(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 149	0	4.12 h	1/2+	+1.36(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 150	0	3.48 h	(2)-	-0.90(2)	CFBLS	1990Al36	ZP A337 367 (90)

65 Tb 151	0	17.6 h	1/2(+)	+0.926(6)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 152	0	17.5 h	2-	-0.58(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 153	0	2.34 d	5/2+	+3.47(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 154	0 + x	9.4 h	3-	+1.6(2)	CFBLS	1990Al36	ZP A337 367 (90)
	0 + y	22.7 h	7-	0.9(3)	NO/S	1983Be03	JP G9 213 (83)
65 Tb 155	0	5.32 d	3/2+	+2.03(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 156	0	5.35 d	3-	1.7(2)	NO/S	1983Be03	JP G9 213 (83)
65 Tb 157	0	71 y	3/2+	+2.03(2)	CFBLS	1990Al36	ZP A337 367 (90)
65 Tb 158	0	180 y	3-	+1.753(7)	EPR	1968Ea04	PR 170 1083 (68)
65 Tb 159	0	stable	3/2+	+2.009(4)	ENDOR	1965Ba49	PRS 286A 352 (65)
65 Tb 160	0	72.3 d	3-	+1.698(8)	EPR	1968Ea04	PR 170 1083 (68)
65 Tb 161	0	6.89 d	3/2+	2.2(1)	NO/S	1983Ri15	HFI 15 83 (83)
66 Dy 147	0	67 s	(1/2+)	-0.915(9)	CFBLS	L	PC Neugart (87)
	751	55 s	(11/2-)	-0.655(10)	CFBLS	L	PC Neugart (87)
66 Dy 149	0	4.2 m	7/2-	-0.119(7)	CFBLS	L	PC Neugart (87)
66 Dy 151	0	17.9 m	7/2-	-0.945(7)	CFBLS	L	PC Neugart (87)
66 Dy 153	0	6.4 h	7/2-	-0.712(6)	AB	1972Ro36	PL 49A 287 (74)
66 Dy 155	0	9.9 h	3/2-	-0.337(3)	AB	1972Ro36	PL 49A 287 (74)
66 Dy 157	0	8.14 h	3/2-	-0.301(2)	AB	1972Ro36	PL 49A 287 (74)
66 Dy 159	0	144 d	3/2-	-0.354(3)	CFBLS	L	PC Neugart (87)
66 Dy 161	0	stable	5/2+	-0.479(3)	AB	1974Fe05	PL 49A 287 (74)
66 Dy 163	0	stable	5/2-	+0.671(4)	AB	1974Fe05	PL 49A 287 (74)
66 Dy 165	0	2.33 h	7/2+	-0.518(6)	AB	1968Ra03	PR 165 1360 (68)/PL 49A 287 (74)
67 Ho 152	0	161.8 s	2-	-1.02(2)	LRIMS	1989Al27	NP A504 549 (89)
	160	49.8 s	9+	+5.92(5)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 153	0	2.01 m	11/2-	+6.79(5)	LRIMS	1989Al27	NP A504 549 (89)
	68	9.3 m	1/2+	+1.19(1)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 154	0	11.76 m	2-	-0.641(6)	LRIMS	1989Al27	NP A504 549 (89)
	0 + x	3.10 m	8+	+5.63(6)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 155	0	48 m	5/2+	+3.50(3)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 156	0	56 m	4-	+2.98(3)	LRIMS	1989Al27	NP A504 549 (89)
	52	9.5 s	1-	+1.81(2)	CLS	1988Ra41	HFI 43 425 (1988)
67 Ho 157	0	12.6 m	7/2-	+4.34(3)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 158	0	11.3 m	5+	+3.776(3)	LRIMS	1989Al27	NP A504 549 (89)
	67.2	28 m	2-	+2.43(3)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 159	0	33.05 m	7/2-	+4.27(3)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 160	0	25.6 m	5+	+3.70(3)	LRIMS	1989Al27	NP A504 549 (89)
	60	5.02 h	2-	+2.51(3)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 161	0	2.48 h	7/2-	+4.24(3)	LRIMS	1989Al27	NP A504 549 (89)

67 Ho 162	0	15.0 m	1+	+2.32(3)	CLS	1988Ra41	HFI 43 425 (1988)
	106	67 m	6-	+3.59(4)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 163	0	4570 y	7/2-	+4.22(4)	LRIMS	1989Al27	NP A504 549 (89)
67 Ho 165	0	stable	7/2-	+4.16(3)	AB	1974Da11	ZP 267 239 (74)
67 Ho 166	6	1200 y	7-	3.62(6)	NO/S	1980Al34	PRS A372 19 (80)
68 Er 153	0	37.1 s	(7/2-)	-0.932(7)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 155	0	5.3 m	7/2-	-0.666(5)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 157	0	18.7 m	3/2-	-0.411(3)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 159	0	36 m	3/2-	-0.303(2)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 161	0	3.21 h	3/2-	-0.364(3)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 163	0	75.0 m	5/2-	+0.556(4)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 165	0	10.36 h	5/2-	+0.641(4)	CFBLS	1987OtZW	CERN EP/87 51 (1987)
68 Er 167	0	stable	7/2+	-0.5623(4)	AB	1984Fo02	ZP A315 1 (84)
68 Er 169	0	9.39 d	1/2-	+0.4828(4)	AB	1963Do09/1965Sm04	PR 131 1586 (63)/PPS 86 1249 (65)
68 Er 171	0	7.52 h	5/2-	0.657(10)	AB	1964Bu09	PR 135 B1281 (64)
69 Tm 153	0	1.48 s	(11/2-)	6.93(11)	LRIS	2000Ba16	PR C61 034304 (00)
69 Tm 154	0	8.1 s	(2-)	-1.14(2)	LRIS	2000Ba16	PR C61 034304 (00)
	0 + x	3.30 s	(9+)	+5.91(5)	LRIS	2000Ba16	PR C61 034304 (00)
69 Tm 156	0	1.40 m	2-	+0.40(3)	LRIMS	1987AlZb	LIYAF 1309 (1987)
69 Tm 157	0	3.63 m	1/2+	+0.476(15)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 158	0	3.98 m	2-	+0.04(2)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 159	0	9.13 m	5/2+	+3.42(3)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 160	0	9.4 m	1-	+0.16(2)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 161	0	30.2 m	7/2+	+2.40(2)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 162	0	21.7 m	1-	+0.068(8)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 163	0	1.81 h	1/2+	-0.082(1)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 164	0	2.0 m	1+	+2.37(3)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 165	0	30.06 h	1/2+	-0.139(2)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 166	0	7.70 h	2+	+0.0926(7)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 167	0	9.25 d	1/2+	-0.197(2)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 168	0	93.1 d	3+	+0.227(11)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 169	0	stable	1/2+	-0.2310(15)	AB	1967Gi04	ZP 199 244 (67)
69 Tm 170	0	128.6 d	1-	+0.247(4)	LRIMS	1988Al04	NP A477 37 (88)
69 Tm 171	0	1.92 y	1/2+	-0.230(4)	LRIMS	1988Al04	NP A477 37 (88)
70 Yb 155	0	1.79 s	(7/2-)	-0.91(2)	LRIS	1998Ba08	EurPJ A1 3 (98)
70 Yb 157	0	38.6 s	7/2-	-0.637(8)	CFBLS	1992Ku21	HFI 74 171 (92)

70 Yb 159	0	1.67 m	5/2(-)	-0.365(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 161	0	4.2 m	3/2-	-0.326(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 163	0	11.0 m	3/2-	-0.373(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 165	0	9.9 m	5/2-	+0.477(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 167	0	17.5 m	5/2-	+0.621(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 169	0	32.0 d	7/2+	-0.633(8)	CFBLS	1983Ne13	HFI 15 181 (83)
	24	46 s	1/2-	+0.506(8)	CFBLS	1983Ne13	HFI 15 181 (83)
70 Yb 171	0	stable	1/2-	+0.4923(4)	OP/RD	1972Ol01	ZP 249 205 (72)
70 Yb 173	0	stable	5/2-	-0.6780(6)	OP/RD	1972Ol01	ZP 249 205 (72)
70 Yb 175	0	4.18 d	7/2-	0.766(8)	CFBLS	1992Ku21	HFI 74 171 (92)
70 Yb 176	1050	11.4 s	8-	-0.151(15)	CLS	2007Bl14	PL B645 330 (07)
70 Yb 177	0	1.91 h	9/2+	-0.695(15)	CLS	2012Fl05	JP G39 125101 (2012)
	332	6.41 s	1/2-	+0.151(15)	CLS	2012Fl05	JP G39 125101 (2012)
71 Lu 161	0	77 s	1/2(+)	+0.222(3)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 162	0	1.37 m	1-	+0.0551(11)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 163	0	238 s	1/2(+)	+0.0767(10)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 164	0	3.14 m	1(-)	+0.0589(11)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 165	0	10.74 m	1/2+	-0.0244(3)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 166	0	2.65 m	6-	+2.903(12)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	34	1.41 m	3(-)	+0.188(5)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 167	0	51.5 m	7/2+	+2.318(4)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	0 + x	>60 s	1/2+	-0.0996(13)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 168	0	5.5 m	6(-)	+3.007(25)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	203	6.7 m	3+	+1.217(5)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 169	0	34.1 h	7/2+	2.288(4)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	29	160 s	1/2-	0.536(7)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 171	0	8.24 d	7/2+	+2.286(4)	CFBLS	1998Ge13	PR C54 1027 (96)
	71	79 s	1/2-	+0.583(7)	CFBLS	1998Ge13	
							EurPJ A3 225 (98)
71 Lu 172	0	6.70 d	4-	+2.891(10)	CFBLS	1998Ge13	PR C54 1027 (96)
	42	3.7 m	1-	+1.97(4)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 173	0	1.37 y	7/2+	+2.273(2)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 174	0	3.31 y	1-	+1.982(5)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	171	142 d	6-	+1.487(16)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 175	0	stable	7/2+	+2.2257(19)	AB	1985Br09	NP A440 407 (85)
71 Lu 176	0	$3.76x10^{10}$ y	7-	+3.160(5)	AB	1985Br09	NP A440 407 (85)
	123	3.66 h	1-	+0.318(3)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 177	0	6.65 d	7/2+	+2.2315(14)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	970	160 d	23/2-	+2.301(11)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 178	0	28.4 m	1(+)	-1.373(9)	CFBLS	1998Ge13	EurPJ A3 225 (98)
	123.8	23.1 m	(9-)	+4.819(9)	CFBLS	1998Ge13	EurPJ A3 225 (98)
71 Lu 179	0	4.59 h	7/2+	+2.368(12)	CFBLS	1998Ge13	EurPJ A3 225 (98)

72 Hf 171	0	12.1 h	7/2(+)	-0.674(12)	CFBLS	2000Ye02	JP G26 839 (00)
	22	29.5 s	1/2(-)	+0.526(16)	CFBLS	2000Ye02	JP G26 839 (00)
72 Hf 173	0	23.6 h	1/2-	+0.502(7)	CFBLS	1999Le11	PRL 82 2476 (99)
72 Hf 175	0	70 d	5/2(-)	-0.677(9)	LRS	2002Ni12	PRL 88 094801 (02)
72 Hf 177	0	stable	7/2-	+0.7910(9)	AB	1973Bu07/1973Bu25	PL 43B 479 (73)/ZP 260 157 (73)
72 Hf 178	1147	4.0 s	8-	+3.09(1)	CLS	2007Bl14	PL B645 330 (07)
	2446	31 y	16+	+8.13(4)	CFBLS	1994Bo15	PRL 72 2689 (94)
72 Hf 179	0	stable	9/2+	-0.6389(14)	AB	1973Bu25	PL 43B 479 (73)/ZP 260 157 (73)
	1106	25.1 d	25/2-	7.4(3)	NO/S	1975Hu15	PR C12 2013 (75)
72 Hf 180	1142	5.53 h	8-	+8.7(10)	ME	1971Ko29	PRL 27 1593 (71)
73 Ta 173	0	3.14 h	5/2-	1.70(3)	NMR/ON	1991Ko25	NP A534 344 (91)
73 Ta 175	0	10.5 h	7/2+	2.27(5)	NMR/ON	1984Oh07	JPJa 53 2479 (84)
73 Ta 177	0	56.6 h	7/2+	2.25(5)	NMR/ON	1984Oh07	JPJa 53 2479 (84)
73 Ta 178	0 + x	9.3 m	(1+)	2.740(12)	NMR/ON	1987Ni05	JPJa 56 492 (87)
73 Ta 179	0	1.82 y	7/2+	+2.286(6)	LRS	1996Wa02	PR C53 611 (96)
73 Ta 180	75	>7.1x10^{15} y	9-	+4.814(12)	LRS	1994Wa34	PR A50 4639 (94)
73 Ta 181	0	stable	7/2+	+2.365(4)	N	1973Er17/1960Be23	JCP 59 3911 (73)/PR 120 1812 (60)
73 Ta 182	0	115 d	3-	3.02(3)	NMR/ON	1980Al27	HFI 8 229 (80)
73 Ta 183	0	5.1 d	7/2+	(+)2.36(3)	NMR/ON	1984Ed01/1980Al27	NP A413 247 (84)/HFI 8 229 (80)
74 W 183	0	>6.7x10^{20} y	1/2-	+0.11739(11)	N	1974Sa25	ZNat 29a 1763 (74)
74 W 185	0	75.1 d	3/2-	+0.543(14)	NMR/ON	2004Oh16	Hyp Int 159 277 (2004)
74 W 187	0	24.0 h	3/2-	0.621(15)	NMR/ON	1987Oh10	HFI 36 219 (87)
75 Re 179	0	19.5 m	(5/2)+	2.8(4)	NO/S	1992Bo39	HFI 75 307 (92)
75 Re 180	0	2.46 m	(1)-	1.6(2)	NO/S	1992Bo39	HFI 75 307 (92)
75 Re 181	0	19.9 h	5/2+	3.19(7)	NMR/ON	1981Ha22	NP A363 269 (81)
75 Re 182	0	64.2 h	7+	2.84(6)	NMR/ON	1981Ha22	NP A363 269 (81)
	0 + x	14.1 h	2+	3.26(10)	NMR/ON	1987Oh10	HFI 36 219 (87)
75 Re 183	0	70.0 d	5/2+	3.158(15)	NMR/ON	1987Oh10	HFI 36 219 (87)
75 Re 184	0	35.4 d	3-	(+)2.53(5)	NMR/ON	1981Ha22	NP A363 269 (81)
	188	169 d	8(+)	(+)2.88(10)	NO/S	1973Hu06/1973Kr01	NP A210 317 (73)/PR C7 263 (73)
75 Re 185	0	stable	5/2+	+3.176(3)	N	1951Al11	PR 82 105 (51)
75 Re 186	0	3.72 d	1-	+1.734(3)	AB/D	1965Ar01	PR 138 B310 (65)
75 Re 187	0	4.3x10^{10} y	5/2+	+3.209(3)	N	1951Al11	PR 82 105 (51)
75 Re 188	0	17.0 h	1-	+1.783(5)	AB/D	1965Ar01	PR 138 B310 (65)
76 Os 183	0	13.0 h	9/2+	(-)0.794(14)	NMR/ON	1980Ha24	ZP A295 345 (80)
76 Os 187	0	stable	1/2-	+0.06442(7)	N	1968Sc03	PL 26A 258 (68)
76 Os 189	0	stable	3/2-	+0.6576(7)	N	1968Sc03	PL 26A 258 (68)
	1705	9.9 m	(10)-	-0.56(+8,-12)	RENO	1987Be54	PRL 59 2923 (87)

76 Os 191	0	15.4 d	9/2-	+0.96(3)	NMR/ON(b)	1996Oh03	PR C54 1129 (96)
76 Os 193	0	30.1 h	3/2-	+0.730(2)	NMR/ON	1989Ed01	PR C40 2246 (89)
77 Ir 180	0	1.5 m	(5+)	(+)2.5(2)	NO/S	1992Bo39	HFI 75 307 (92)
77 Ir 182	0	15.0 m	3+	+2.6(2)	LS	2006Ve10	Eur Phys J A30 489 (06)
77 Ir 183	0	58 m	5/2-	+2.39(8)	LS	2006Ve10	Eur Phys J A30 489 (06)
77 Ir 184	0	3.09 h	5-	0.693(5)	NMR-ON	1988Oh02	JP G14 365 (88)
77 Ir 185	0	14.4 h	5/2-	2.596(13)	NMR/ON	1988Oh02	JP G14 365 (88)
77 Ir 186	0	16.64 h	5+	3.80(+12,-2)	NMR/ON	1980Ha49	ZP A297 329 (80)
	0 + x	1.90 h	2-	0.638(8)	NMR/ON	1990Ed01	HFI 59 83 (90)
77 Ir 187	0	10.5 h	3/2+	+0.17(1)	LS	2006Ve10	Eur Phys J A30 489 (06)
77 Ir 188	0	41.5 h	1-	0.302(10)	NMR/ON, NO/S	1985Ed02	PR C32 582 (85)
77 Ir 189	0	13.2 d	3/2+	+0.147(7)	LS	2006Ve10	Eur Phys J A30 489 (06)
77 Ir 190	0	11.8 d	4-	0.04(1)	NO/S	1983Al15	JP G9 1125 (83)
77 Ir 191	0	stable	3/2+	+0.1502(6)	AB	1984Bu15	PL 140B 17 (84)
	171	4.90 s	11/2-	+6.03(4)	NMR/ON	1971Es03/1974Kr06	PL 36B 328 (71)/PR C9 2063 (74)
77 Ir 192	0	73.8 d	4+	+1.917(10)	NMR/ON	1980Ha25	ZP A295 385 (80)
77 Ir 193	0	stable	3/2+	+0.1630(6)	AB	1984Bu15	PL 140B 17 (84)
77 Ir 194	0	19.3 h	1-	+0.39(1)	NMR/ON	1982Ha28	ZP A306 73 (82)
78 Pt 179	0	21.2 s	1/2-	+0.43(3)	LRIMS	1999Le52	PR C60 054310 (99)
78 Pt 181	0	52 s	1/2-	+0.48(2)	LRIMS	1999Le52	PR C60 054310 (99)
78 Pt 183	0	6.5 m	1/2-	+0.500(5)	LRIMS	1999Le52	PR C60 054310 (99)
	35	43 s	7/2-	+0.779(14)	LRIMS	1999Le52	PR C60 054310 (99)
78 Pt 185	0	70.9 m	9/2+	-0.720(11)	LRIMS	1999Le52	PR C60 054310 (99)
	103	33 m	1/2-	+0.501(5)	LRIMS	1999Le52	PR C60 054310 (99)
78 Pt 187	0	2.35 h	3/2-	-0.397(8)	LRIMS	2000SaZQ/1989Du01	IPNO-DR 00-04/PL 217 401 (89)
78 Pt 189	0	10.9 h	3/2-	-0.438(8)	LRIMS	1992Hi07	ZP A342 1 (92)
78 Pt 191	0	2.83 d	3/2-	-0.499(5)	LRIMS	1989Du01	PL 217 401 (89)
78 Pt 193	0	50 y	1/2-	+0.601(8)	LRIMS	1992Hi07	ZP A342 1 (92)
	150	4.3 d	13/2+	(-)0.753(15)	NMR/ON(X)	1986Sc04	PRL 56 1051 (86)
78 Pt 195	0	stable	1/2-	+0.6073(7)	N	1951Pr02	PR 81 20 (51)
78 Pt 197	0	19.9 h	1/2-	0.51(2)	AB	1976Fu06	JPCR 5 835 (76)
78 Pt 199	0	30.8 m	5/2-	+0.75(8)	LIS	2017Hi05	PR C96 014307 (2017)
	424	13.6 s	(13/2)+	-0.57(5)	LIS	2017Hi05	PR C96 014307 (2017)
79 Au 177	0	1.46 s	1/2+	1.15(5)	LRIS	2018Cu04	PL B786 355 (2018)
79 Au 179	0	7.1 s	1/2+	1.01(5)	LRIS	2018Cu04	PL B786 355 (2018)
79 Au 182	0	15.5 s	(2+)	1.30(10)	TR/OLNO	1992Ro21	HFI 75 457 (92)
79 Au 183	0	42.8 s	(5/2)-	+1.96(2)	LRIMS	1988Kr18	ZP A331 521 (88)
79 Au 184	0	20.6 s	5+	+2.06(2)	LRIS	1997Le22	PRL 79 2213 (97)

	68	47.6 s	2+	+1.43(2)	LRIS	1997Le22	PRL 79 2213 (97)
79 Au 185	0	4.25 m	5/2-	+2.16(2)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
79 Au 186	0	10.7 m	3-	-1.26(3)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
79 Au 187	0	8.4 m	1/2+	+0.533(15)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
79 Au 188	0	8.84 m	1(-)	-0.07(3)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
79 Au 189	0	28.7 m	1/2+	+0.492(14)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
	247	4.6 m	11/2-	+6.17(2)	LRIMS	1989Wa11/1987Wa06	NP A493 224 (89)/PRL 58 1516 (87)
79 Au 190	0	42.8 m	1-	-0.065(7)	LRIMS	1990Sa21	NP A512 241 (90)
79 Au 191	0	3.18 h	3/2+	+0.1364(9)	LRIMS	1994Pa37	NP A580 173 (94)
	266	0.92 s	11/2-	6.6(6)	NO/S	1985Va07	HFI 22 507 (85)
79 Au 192	0	4.94 h	1-	-0.0107(15)	LRIMS	1994Pa37	NP A580 173 (94)
79 Au 193	0	17.65 h	3/2+	+0.1391(5)	LRIMS	1994Pa37	NP A580 173 (94)
	290	3.9 s	11/2-	6.16(9)	NMR/ON	1983Ha10	NP A399 83 (83)
79 Au 194	0	38.0 h	1-	+0.0760(13)	LRIMS	1994Pa37	NP A580 173 (94)
79 Au 195	0	186 d	3/2+	0.1481(6)	NMR/ON	1993Hi10	NP A562 205 (93)
	319	30.5 s	11/2-	6.16(9)	NMR/ON	1981Ha27	PR C24 631 (81)
79 Au 196	0	6.17 d	2-	0.5883(5)	NMR/ON	1987Oh11	PR C36 2072 (87)
	596	9.6 h	12-	5.70(8)	NMR/ON	1982Ha04	NP A373 256 (82)
79 Au 197	0	stable	3/2+	+0.1452(2)	AB	1967Da04	ZP A200 456 (67)
	409	7.73 s	11/2-	(+)5.96(9)	NMR/ON	1984Ha12	NP A417 88 (84)
79 Au 198	0	2.694 d	2-	+0.5911(8)	AB	1967Va16	PR 158 1078 (67)
	812	2.27 d	(12-)	(+)5.83(9)	NMR/ON	1984Ha12	NP A417 88 (84)
79 Au 199	0	3.14 d	3/2+	+0.2705(8)	AB	1967Va16	PR 158 1078 (67)
79 Au 200	962	18.7 h	12-	5.88(9)	NMR/ON	1984Ha45	PR C30 1675 (84)
80 Hg 177	0	118 ms	(7/2-)	-1.02(5)	LRIS	2019Se04	PR C99 044306 (2019)
80Hg 179	0	1.05 s	(7/2-)	-0.94(2)	LRIS	2019Se04	PR C99 044306 (2019)
80 Hg 181	0	3.6 s	1/2-	+0.5051(7)	NMR/OP(b)	1976Bo09	ZP A276 203 (76)
80 Hg 183	0	9.4 s	1/2-	+0.522(5)	NMR/OP(b)	1976Bo09	ZP A276 203 (76)
80 Hg 185	0	49.1 s	1/2-	+0.505(4)	NMR/OP(b)	1986Ul02	ZP A325 247 (86)
	99	21.6 s	13/2+	-1.013(9)	CLS	1986Ul02	ZP A325 247 (86)
80 Hg 187	0	1.9 m	3/2-	-0.591(4)	NMR/OP(b)	1986Ul02	ZP A325 247 (86)
	0 + x	2.4 m	13/2+	-1.040(11)	CLS	1979Da06	PL 82B 199 (79)
80 Hg 189	0	7.6 m	3/2-	-0.6062(10)	NMR/OP(b)	1986Ul02	ZP A325 247 (86)
	0 + x	8.6 m	13/2+	-1.054(6)	CLS	1979Da06	PL 82B 199 (79)
80 Hg 191	0	49 m	3/2-	-0.616(11)	NMR/OP(b)	1986Ul02	ZP A325 247 (86)
	0 + x	50.8 m	13/2+	-1.064(5)	CLS	1979Da06	PL 82B 199 (79)
80 Hg 193	0	3.80 h	3/2-	-0.6251(8)	NMR/OP	1971Mo24	PR C4 620 (71)
	141	11.8 h	13/2+	-1.0543(12)	NMR/OP	1973Re04	PR C7 2065 (73)
80 Hg 195	0	10.5 h	1/2-	+0.5393(6)	NMR/OP	1973Re04	PR C7 2065 (73)
	176	41.6 h	13/2+	-1.0405(12)	NMR/OP	1973Re04	PR C7 2065 (73)
80 Hg 197	0	64.1 h	1/2-	+0.5253(6)	NMR/OP	1973Re04	PR C7 2065 (73)
	299	23.8 h	13/2+	-1.0236(12)	NMR/OP	1973Re04	PR C7 2065 (73)

80 Hg 199	0	stable	1/2-	+0.5039(6)	NMR/OP	1961Ca21	AnP 6 467 (61)
	532	42.7 m	13/2+	-1.0107(12)	NMR/OP(b)	1973Re04	PR C7 2065 (73)
80 Hg 201	0	stable	3/2-	-0.5580(7)	NMR/OP	1973Re04	PR C7 2065 (73)
80 Hg 203	0	46.6 d	5/2-	+0.8456(10)	NMR/OP(b)	1970Ki05/1964Re03	PL 31B 567 (70)/PL 8 257 (64)
80 Hg 205	0	5.14 m	1/2-	+0.5985(7)	NMR/OP(b)	1975Ro10	ZP A272 369 (75)
81 Tl 179	0	0.23 s	1/2+	1.631(16)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 180	(0)	1.09 s	(4)	-0.56(2)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 181	0	3.2 s	1/2+	1.632(14)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 182	(0)	3.1 s	(7+)	0.54(10)	ISLS	2017Ba04	PR C95 014324 (2017)
	-	-	(4)	-0.55(3)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 183	0	6.9 s	1/2+	1.597(8)	ISLS	2017Ba04	PR C95 014324 (2017)
	-	53 ms	(9/2-)	3.61(6)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 184	0 + y	-	(2-)	0.32(4)	ISLS	2017Ba04	PR C95 014324 (2017)
	0 + x	-	(7+)	0.43(2)	ISLS	2017Ba04	PR C95 014324 (2017)
	500 + x	-	(10-)	2.77(8)	ISLS	2017Ba04	PR C95 014324 (2017)
81 Tl 185	0	19.5 s	(1/2+)	1.60(4)	ISLS	2013Ba41	PR C88 024315 (2013)
	455	1.93 s	(9/2-)	3.8(2)	ISLS	2013Ba41	PR C88 024315 (2013)
81 Tl 186	374 + x	2.9 s	(10-)	2.56(6)	ISLS	2013Ba41	PR C88 024315 (2013)
81 Tl 187	0	~51 s	(1/2+)	1.54(6)	CFBLS	1992Sc25	HFI 74 13 (92)
	334	15.6 s	(9/2-)	+3.71(2)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 188	0 + x	71 s	7+	+0.481(8)	CFBLS	1992Me07	ZP A341 475 (92)
81 Tl 189	281	1.4 m	9/2-	+3.76(2)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 190	0 + x	2.6 m	2(-)	+0.253(2)	CFBLS	1992Me07	ZP A341 475 (92)
	0 + y	3.7 m	7(+)	+0.493(4)	CFBLS	1987Bo44	PR C36 2560 (87)
81 Tl 191	0	-	1/2+	+1.582(4)	CFBLS	1992Me07	ZP A341 475 (92)
	299	5.2 m	9/2-	+3.78(2)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 192	0	9.6 m	2-	+0.199(3)	CFBLS	1992Me07	ZP A341 475 (92)
	0 + x	10.8 m	7+	+0.516(4)	CFBLS	1987Bo44	PR C36 2560 (87)
81 Tl 193	0	21.6 m	1/2(+)	+1.585(3)	CFBLS	1987Bo44	PR C36 2560 (87)
	365 + x	2.11m	(9/2-)	+3.82(2)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 194	0	33.0 m	2-	+0.139(3)	CFBLS	1992Me07	ZP A341 475 (92)
	0 + x	32.8 m	(7+)	+0.538(5)	CFBLS	1987Bo44	PR C36 2560 (87)
81 Tl 195	0	1.16 h	1/2+	+1.57(4)	O	1969Go21	PR 188 1897 (69)
	483	3.6 s	9/2-	+3.87(4)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 196	0	1.84 h	2-	+0.072(3)	CFBLS	1992Me07	ZP A341 475 (92)
	394	1.41 h	(7+)	+0.547(8)	CFBLS	1992Me07	ZP A341 475 (92)
81 Tl 197	0	2.84 h	1/2+	+1.57(2)	O	1966Da15	JOSA 56 1604 (66)
	216	0.54 s	9/2-	+4.03(6)	RIS	2012Ba32	PR C86 014311 (12)
81 Tl 198	0	5.3 h	2-	0.00(1)	AB	1976Ek03/1984Be40	HFI 1 437 (76)/PS 30 164 (84)
	544	1.87 h	7+	+0.639(10)	AB	1983Bu04	NP A395 182 (83)
81 Tl 199	0	7.42 h	1/2+	+1.59(2)	O	1961Hu04	JOSA 51 1203 (61)
81 Tl 200	0	26.1 h	2-	0.04(1)	AB	1976Ek03/1984Be40	HFI 1 437 (76)/PS 30 164 (84)
81 Tl 201	0	3.04 d	1/2+	+1.599(3)	CFBLS	1987Bo44	PR C36 2560 (87)

81 Tl 202	0	12.3 d	2-	0.06(1)	AB	1976Ek03/1984Be40	HFI 1 437 (76)/PS 30 164 (84)
81 Tl 203	0	stable	1/2+	+1.616(2)	N	1963Ba23/1950Pr51	RSI 34 238 (63)/PR 79 35 (50)
81 Tl 204	0	3.78 y	2-	0.09(1)	AB	1976Ek03	HFI 1 437 (76)
81 Tl 205	0	stable	1/2+	+1.632(2)	N	1963Ba23/1950Pr51	RSI 34 238 (63)/PR 79 35 (50)
81 Tl 207	0	4.77 m	1/2+	+1.869(5)	CFBLS	1985Ne06	PRL 55 1559 (85)
81 Tl 208	0	3.05 m	5+	+0.291(13)	LRSRD	1992La03	PRL 68 1675 (92)
82 Pb 183	0	0.53 s	3/2-	-1.154(5)	LRIS	2009Se13	Eur Phys J A41 315 (09)
	97	0.41 s	13/2+	-1.241(6)	LRIS	2009Se13	Eur Phys J A41 315 (09)
82 Pb 185	0	6.3 s	3/2-	-1.137(5)	LRIS	2009Se13	Eur Phys J A41 315 (09)
	0 + x	4.3 s	13/2+	-1.23(1)	LRIS	2009Se13	Eur Phys J A41 315 (09)
82 Pb 187	0	15.2 s	3/2-	-1.122(3)	LRIS	2009Se13	Eur Phys J A41 315 (09)
	33	18.3 s	13/2+	-1.206(5)	LRIS	2009Se13	Eur Phys J A41 315 (09)
82 Pb 189	0	39 s	3/2-	-1.077(9)	LRIS	2009Se13	Eur J Phys A41 315 (09)
	0 + x	50 s	13/2+	-1.19(1)	LRIS	2009Se13	Eur J Phys A41 315 (09)
82 Pb 191	-	2.18 m	13/2+	-1.167(7)	CFBLS	1991Du07	ZP A341 39 (91)
82 Pb 193	0 + x	5.8 m	(13/2+)	-1.146(7)	CFBLS	1991Du07	ZP A341 39 (91)
82 Pb 195	203	15.0 m	13/2+	-1.124(7)	CFBLS	1991Du07	ZP A341 39 (91)
82 Pb 197	0	8.1 m	3/2-	-1.0718(23)	ABLFS	1986An06	NP A451 471 (86)
	319	42.9 m	13/2+	-1.1009(27)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 199	0	1.5 h	3/2-	-1.0707(14)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 201	0	9.33 h	5/2-	+0.6731(6)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 202	2170	3.62 h	9-	-0.226897)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 203	0	51.9 h	5/2-	+0.6841(6)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 205	0	1.73x10^{7} y	5/2-	+0.7094(6)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 207	0	stable	1/2-	+0.5906(4)	NMR	2016Ad43	Phys Chem Chem Phys 18 16483 (2016)
82 Pb 209	0	3.23 h	9/2+	-1.4686(19)	ABLFS	1986An06	NP A451 471 (86)
82 Pb 211	0	36.1 m	9/2+	-1.3991(12)	ABLFS	1986An06	NP A451 471 (86)
83 Bi 189	0	688 ms	(9/2-)	3.7(3)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 190	0 + x	6.3 s	(3+)	3.85(9)	ISLS	2017Ba12	PR C95 044324 (2017)
	0 + y	6.2 s	(10-)	2.39(12)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 191	0	12.4 s	(9/2-)	3.66(5)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 192	0	34.5 s	(3+)	4.16(17)	ISLS	2017Ba12	PR C95 044324 (2017)
	147	39.6 s	(10-)	2.36(12)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 193	0	63.6 s	(9/2-)	3.72(10)	ISLS	2016Ba42	PR C94 024334 (2016)
	308	3.2 s	(1/2+)	1.49(3)	ISLS	2016Ba42	PR C94 024334 (2016)
83 Bi 194	0	95 s	(3+)	4.17(10)	ISLS	2017Ba12	PR C95 044324 (2017)
	0 + x	115 s	(10-)	2.46(11)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 195	0	183 s	(9/2-)	3.85(10)	ISLS	2016Ba42	PR C94 024334 (2016)
	401	87 s	(1/2+)	1.53(3)	ISLS	2016Ba42	PR C94 024334 (2016)
83 Bi 197	0	9.33 m	(9/2-)	3.90(11)	ISLS	2016Ba42	PR C94 024334 (2016)
	500	5.04 m	(1/2+)	1.60(5)	ISLS	2016Ba42	PR C94 024334 (2016)

83 Bi 198	0 + x	7.7 s	(10-)	2.45(7)	ISLS	2017Ba12	PR C95 044324 (2017)
83 Bi 199	0	27 m	9/2-	4.6(4)	NO/S	1988Wo12	HFI 43 401 (88)
83 Bi 201	0	103 m	9/2-	4.8(3)	NO/S	1988Wo12	HFI 43 401 (88)
83 Bi 202	0	1.71 h	5+	+4.240(14)	LRFS	1996Ca02	NP A598 61 (96)
83 Bi 203	0	11.8 h	9/2-	+3.999(13)	LRFS	1996Ca02	NP A598 61 (96)
83 Bi 204	0	11.22 h	6+	+4.302(15)	LRFS	1996Ca02	NP A598 61 (96)
83 Bi 205	0	15.3 d	9/2-	+4.047(7)	LRFS	1997Ki15	PL B405 31 (97)
83 Bi 206	0	6.243 d	6+	+4.341(8)	LRFS	1997Ki15	PL B405 31 (97)
83 Bi 207	0	31.6 y	9/2-	4.0729(20)	LRFS	2000Pe30	JP G26 1829 (00)
83 Bi 208	0	$3.7x10^5$ y	5+	+4.572(10)	LRS	2018Sc04	PL B779 (2018)
83 Bi 209	0	$2.0x10^{19}$ y	9/2-	+4.092(2)	N	2018Sk03	PRL 120 093001 (2018)
83 Bi 210	0	5.01 d	1-	-0.0443(1)	AB	1962Al02	PR 125 256 (62)
	271	$3.0x10^6$ y	9-	+2.72(4)	LRFS	1997Kl15	PL B405 31 (97)
83 Bi 211	0	2.14 m	9/2-	+3.85(3))	LRS	2018Ba03	PR C97 014322 (2018)
83 Bi 212	0	60.6 m	1(-)	+0.32(4)	LRFS	1997Ki15	PL B405 31 (97)
83 Bi 213	0	45.6 m	9/2-	+3.699(7)	LRFS	1997Ki15	PL B405 31 (97)
84 Po 195	0	4.64 s	(3/2-)	-0.60(4)	LRIS	2014Se07	PR C89 034323 (2014)
	~ 230	1.92 s	(13/2+)	-0.93(7)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 197	0	84 s	(3/2-)	-0.88(7)	LRIS	2014Se07	PR C89 034323 (2014)
	204	32 s	(13/2+)	-1.05(8)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 199	0	5.47 m	(3/2-)	-0.91(7)	LRIS	2014Se07	PR C89 034323 (2014)
	310	4.17 m	13/2+	-1.00(7)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 201	0	15.6 m	3/2-	-0.98(7)	LRIS	2014Se07	PR C89 034323 (2014)
	424	9.0 m	13/2+	-1.00(7)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 203	0	36.7 m	5/2-	+0.74(5)	LRIS	2014Se07	PR C89 034323 (2014)
	642	45 s	13/2+	-0.97(7)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 205	0	1.74 h	5/2-	+0.76(6)	NMR/ON	1983He09	ZP A311 351 (83)
84 Po 207	0	5.80 h	5/2-	+0.79(6)	NMR/ON	1983He09	ZP A311 351 (83)
84 Po 209	0	124 y	1/2-	0.68(8)	O	1966Ch27	JOSA 56 1292 (66)
84 Po 211	0	0.516 s	9/2+	-1.20(8)	LRIS	2014Se07	PR C89 034323 (2014)
84 Po 217	0	1.53 s	(9/2+)	-1.11(10)	LIST	2015Fi07	PR X5 011018 (2015)
85 At 195	0	290 ms	(1/2+)	+1.60(5)	LRIS	2018Cu02	PR C97 054327 (2018)
		143 ms	(7/2-)	+3.70(13)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 196	0	387 ms	(3+)	+3.72(14)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 197	0	381 ms	(9/2-)	+3.83(7)	LRIS	2018Cu02	PR C97 054327 (2018)
		2.0 s	(1/2+)	+1.54(4)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 198	0	4.1 s	(3+)	+4.02(14)	LRIS	2018Cu02	PR C97 054327 (2018)
		1.03 s	(10-)	+2.54(10)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 199	0	6.92 s	(9/2-)	+3.94(7)	LRIS	2018Cu02	PR C97 054327 (2018)
		310 ms	(1/2+)	+1.59(6)	LRIS	2018Cu02	PR C97 054327 (2018)

85 At 200	0	43 s	(3+)	+4.28(15)	LRIS	2018Cu02	PR C97 054327 (2018)
		47 s	(7+)	+4.72(18)	LRIS	2018Cu02	PR C97 054327 (2018)
		3.5 s	(10-)	+2.68(11)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 201	0	83 s	(9/2-)	+4.01(7)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 202	0	184 s	(3+)	+4.14(16)	LRIS	2018Cu02	PR C97 054327 (2018)
		182 s	(7+)	+4.52(19)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 203	0	7.4 m	9/2-	+4.00(7)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 204	0	9.22 m	7+	+4.82(18)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 205	0	26.9 m	9/2-	+4.09(7)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 206	0	30.6 m	(6+)	+4.37(17)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 207	0	1.80 h	9/2+	+4.13(7)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 208	0	1.63 h	6+	+4.46(18)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 209	0	5.41 h	9/2+	+4.12(7)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 210	0	8.1 h	(5)+	+4.72(16)	LRIS	2018Cu02	PR C97 054327 (2018)
85 At 211	0	7.21 h	9/2-	Ref. estimated +4.14	not measured	2018Cu02	PR C97 054327 (2018)
85 At 217	0	32.3 ms	9/2-	3.8(2)	NO/S	1992Li26	HFI 75 323 (92)
86 Rn 203	362	26.9 s	(13/2+)	-0.9555(18)	CFBLS	1987Bo29	HFI 34 25 (87)
86 Rn 205	0	2.83 m	5/2-	+0.7980(16)	CFBLS	1987Bo29	HFI 34 25 (87)
86 Rn 207	0	9.3 m	5/2-	+0.8124(16)	CFBLS	1987Bo29	HFI 34 25 (87)
86 Rn 209	0	28.8 m	5/2-	+0.8348(12)	N, OP/RD	1988Ki03	PRL 60 2133 (88)
86 Rn 211	0	14.6 h	1/2-	+0.5984(12)	CFBLS	1988Ki03	PRL 60 2133 (88)
86 Rn 219	0	3.96 s	5/2+	-0.4399(12)	CFBLS	1988Ki03	PRL 60 2133 (88)
86 Rn 221	0	25 m	7/2+	-0.0201(6)	CFBLS	1988Ki03	PRL 60 2133 (88)
86 Rn 223	0	24.3 m	7/2(-)	-0.772(8)	CFBLS	1988NeZZ	Bk88 NFFS 126
86 Rn 225	0	4.66 m	7/2-	-0.693(8)	CFBLS	1988NeZZ	Bk88 NFFS 126
87 Fr 202	0	0.30 s	(3+)	+3.90(5)	CLS	2013Fl09	PRL 111 212501 (2013)
	0 + x	0.29 s	(10-)	+2.34(4)	CLS	2013Fl09	PRL 111 212501 (2013)
87 Fr 203	0	0.55 s	(9/2-)	+3.74(4)	CLS	2017Wi11	PR C96 034317(2017)
87 Fr 204	0	1.8 s	(3+)	+3.99(3)	CLS	2015Vo05	PR C91 044307 (2015)
	41	1.6 s	(7+)	+4.62(4)	CLS	2015Vo05	PR C91 044307 (2015)
	316	0.8 s	(10-)	+2.34(2)	CLS	2015Vo05	PR C91 044307 (2015)
87 Fr 205	0	3.9 s	(9/2-)	+3.80(3)	CLS	2015Vo05	PR C91 044307 (2015)
87 Fr 206	0	16 s	3+	+3.97(5)	CLS	2016Ly01	PR C93 014319(2016)
	95 - x	16 s	7(+)	+4.70(5)	CLS	2016Ly01	PR C93 014319(2016)
	672 - x	0.7 s	10(-)	+2.45(3)	CLS	2016Ly01	PR C93 014319(2016)
87 Fr 207	0	14.8 s	9/2-	+3.87(4)	CLS	2017Wi11	PR C96 034317(2017)
87 Fr 208	0	59.1 s	7+	+4.71(4)	CLS	2015Vo05	PR C91 044307 (2015)
87 Fr 209	0	50.5 s	9/2-	+3.93(5)	ABLS	1985Co24/1986Ek02	PL 163B 66 (85)/PS 34 624 (86)
87 Fr 210	0	3.18 m	6+	+4.38(5)	TLS	2008Go11	PRL 100 172502 (08)

87 Fr 211	0	3.10 m	9/2-	+3.97(5)	CLS	2014Ly01	PR X4 011055 (2014)
87 Fr 212	0	20.0 m	5+	+4.59(5)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 213	0	34.8 s	9/2-	+3.99(1)	ABLS	1985Co24/1986Ek02	PL 163B 66 (85)/PS 34 624 (86)
87 Fr 214	0	5 ms	if 1-	+0.241(16)	CLS	2016Fa11	PR C94 054305 (2016)
			if 2-	+0.288(20)	CLS	2016Fa11	PR C94 054305 (2016)
87 Fr 220	0	27.4 s	1+	-0.66(1)	CLS	2014Ly01	PR X4 011055 (2014)
87 Fr 221	0	4.9 m	5/2-	+1.57(2)	CLS	2014Ly01	PR X4 011055 (2014)
87 Fr 222	0	14.2 m	2-	+0.63(1)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 223	0	22.0 m	3/2(-)	+1.16(1)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 224	0	3.3 m	1(-)	+0.40(1)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 225	0	3.95 m	3/2-	+1.06(1)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 226	0	49 s	1-	+0.0712(14)	ABLS	1986Du16	JPPa 47 1903 (86)
87 Fr 227	0	2.47 m	1/2+	+1.49(2)	ABLS	1985Co24	PL 163B 66 (85)
87 Fr 228	0	38 s	2-	-0.76(1)	ABLS	1985Co24	PL 163B 66 (85)
88 Ra 209	0	4.8 s	5/2-	+0.861(13)	CFBLS	1987Ar20	PRL 59 771 (87)
88 Ra 211	0	13s	5/2-	+0.874(4)	CFBLS	1987Ar20	PRL 59 771 (87)
88 Ra 213	0	2.73 m	1/2-	+0.610(2)	CFBLS	1987Ar20	PRL 59 771 (87)
	1770	2.15 ms	(17/2-)	7.4(4)	LEMS	1994Ne01	PR C49 645 (94)
88 Ra 221	0	28 s	5/2-	-0.1790(17)	CFBLS	1987Ar20	PRL 59 771 (87)
88 Ra 223	0	11.43 d	3/2+	+0.2692(8)	CRIS	2018Ly01	PR C97 024309 (2018)
88 Ra 225	0	14.9 d	1/2-	-0.730(2)	CFBLS	1987Ar20	PRL 59 771 (87)
88 Ra 227	0	42.2 m	3/2+	-0.4010(11)	CRIS	2018Ly01	PR C97 024309 (2018)
88 Ra 229	0	4.0 m	5/2+	+0.4992(14)	CRIS	2018Ly01	PR C97 024309 (2018)
88 Ra 231	0	104 s	(5/2+)	-0.3554(11)	CRIS	2018Ly01	PR C97 024309 (2018)
89 Ac 212	0	0.93 s	(7+)	+5.0(3)	IGLIS	2017Gr18	PR C96 054331 (2017)
89 Ac 213	0	0.74 s	(9/2-)	+4.2(4)	IGLIS	2017Gr18	PR C96 054331 (2017)
89 Ac 214	0	8.3 s	5+	+4.83(20)	IGLIS	2017Gr18	PR C96 054331 (2017)
89Ac 215	0	0.17 s	9/2-	+4.14(6)	IGLIS	2017Gr18	PR C96 054331 (2017)
89 Ac 227	0	21.77 y	3/2-	+1.1(1)/1.22(17)	O/R	1955Fr26/2017Gr18	PR 98 1514 (55)/PR C96 054331 (2017)
90 Th 229	0	7880 y	5/2+	+0.46(4)	O	1974Ge06	JPPa 35 483 (74)
91 Pa 228	0	22 h	3+	3.5(5)	NO/S	1989He07	NP A493 83 (89)
91 Pa 230	0	17.4 d	2-	2.0(2)	NO/S	1989He07	NP A493 83 (89)
91 Pa 231	0	$3.3x10^4$ y	3/2-	1.99(2)	ENDOR	1961Ax01	PR 121 1630 (61)
91 Pa 233	0	27.0 d	3/2-	4.0(7)	NO/S	L	ARISKP (84)
92 U 233	0	$1.6x10^5$ y	5/2+	-0.59(5)	ABLS	1990Ga28	BASP 54 (5) 13 (90)
92 U 235	0	$7.0 x10^8$ y	7/2-	-0.38(3)	CFBLS	1983Ni08	PRL 51 1749 (83)

93 Np 237	0	2.1 x 10^6 y	5/2+	+3.16(10)	EPR, R	1970Le29	JCP 53 809 (70)
94 Pu 239	0	24110 y	1/2+	+0.202(4)	AB/D	1965Fa02	PL 16 71 (65)
94 Pu 241	0	14.3 y	5/2+	-0.678(14)	O	1969Ge04	Phca 42 581 (69)
95 Am 241	0	432.6 y	5/2-	1.60(1)	LRS	1990Iz01	JRNC 143 93 (90)
95 Am 242	0	16.0 h	1-	+0.3854(17)	AB/D	1966Ar04	PR 144 994 (66)
	49	152 y	5-	+1.00(5)	LRS	1988Be30	ZP A330 235 (88)
	2200	14 ms	(2+,3-)	-1.14(8)	LRS	1996Ba52	HFI 97/98 535 (96)
95 Am 243	0	7364 y	5/2-	+1.52(1)	LRS	1990Iz01	JRNC 143 93 (90)
96 Cm 243	0	29.1 y	5/2+	0.40(8)	EPR	1973Ab03	PL 44A 527 (73)
96 Cm 245	0	8423 y	7/2+	0.5(1)	EPR	1970Ab03	PR B1 3555 (70)
96 Cm 247	0	1.56 x 10^7 y	9/2-	0.36(7)	EPR	1973Ab03	PL 44A 527 (73)
97 Bk 249	0	330 d	7/2+	2.0(4)	EPR	1972Bo67	PL 42A 93 (72)
99 Es 253	0	20.5 d	7/2+	+4.10(7)	AB/D	1975Go05	PR A11 499 (75)
99 Es 254	0	276 d	(7+)	4.4(4)	NO	2009Se09	PR C79 064322 (09)
	84	39.3 h	2+	2.90(7)	AB	1975Go05	PR A11 499 (75)
102 No 253	0	1.62 m	(9/2-)	-0.53(8)	CLS	2018Ra11	PRL 120 232503 (2018)

Appendix 2

TABLE OF DIAMAGNETIC CORRECTIONS

The table lists the corrected moments taken as standard and in column 5 the diamagnetic correction, made for each element. The LFJ corrections adopted by Raghavan [1] are given in column 6 and the percentage difference between the two corrections is shown in column 7.
For those elements for which up-to-date calculations exist the resulting correction is the entry in column 5 and reference is given. For all other elements the correction in column 5 has the LFJ value σ value reduced by 25% with an uncertainty of +/- 10%.

Z	*Element*	*Reference* isotope(s)	*Adopted* Moment (nm) (see full Table)	*Diamagnetic* correction applied in this Table	*LFJ* Correction	*Correction* Adjustment (%) (Applied/LFJ–1)	*Diamagnetic* Correction Reference
1	H	p	2.792847356(23)	1.0000335(5)	1.000026	29	
2	He	2 He 3	1.066639915(3)	1.000060	1.000060	0	.
3	Li	3 Li 7	+3.96136	1.000091(3)	1.000105	-14	
4	Be	4 Be 9	-1.177430(5)	1.000097(4)	1.000153	-36	CPL 588 57 (2013)
5	B	5 B 10	+1.8004636(8)	1.000112(3)	1.000207	-46	JCP 130 044309 (2009)
		5 B 11	+2.688378(1)	1.000112(3)	1.000207		
6	C	6 C 13	+0.702369(4)	1.000195(5)	1.000267	-27	CPL 411 111 (2005)
7	N	7 N 14	+0.403573(2)	1.000224(5)	1.000333	-30	CPL 411 111 (2005)
		7 N 15	-0.2830569(14)	1.000224(5)	1.000333		
8	O	8 O 17	-1.893543(10)	1.000323(5)	1.000406	-20	CPL 411 111 (2005)
9	F	9 F 19	+2.628335(2)	1.000409(5)	1.000484	-16	CPL 411 111 (2005)
10	Ne	10 Ne 21	-0.66170(3)	1.00043(4)	1.000569	-	
11	Na	11 Na 23	+2.21750(3)	1.000581(10)	1.000650	-11	CPL 532 1 (2012)
12	Mg	12 Mg 25	-0.85533(3)	1.000602(18)	1.000732	-18	CPL 588 57 (2013)
13	Al	13 Al 27	+3.64070(2)	1.000600(4)	1.000817	-27	JCP 143 074301 (2015)
14	Si	14 Si 29	-0.555052(3)	1.000476	1.000905	-53	JPhysChem A110 11462 (2006)
15	P	15 P 31	+1.130925(5)	1.000615(15)	1.000998	-27	JPhysChem A115 10617 (2011)
16	S	16 S 33	+0.643247(11)	1.000204	1.001093	-81	CPL 411 111 (2005)

Z	*Element*	*Reference* isotope(s)	*Adopted* Moment (nm) (see full Table)	*Diamagnetic* correction applied in this Table	*LFJ* Correction	*Correction* Adjustment (%) (Applied/LFJ–1)	*Diamagnetic* Correction Reference
17	Cl	17 Cl 35	+0.82170(2)	1.000979	1.001191	-18	JCP 139 234302 (2013)
		17 Cl 37	+0.68400(1)				
18	Ar	18 Ar 37	+1.146(5)	1.00097(10)	1.001294	-	
19	K	19 K 39	+0.391470(8)	1.001300(20)	1.001394	-5	CPL 532 1 (2012)
		19 K 41	+0.214872(5)	1.001300(20)			
20	Ca	20 Ca 43	-1.31733(6)	1.001259(38)	1.001495	-16	CPL 588 57 (2013)
21	Sc	21 Sc 45	+4.75400(8)	1.001083(16)	1.001603	-32	CPL 660 127 (2016)
22	Ti	22 Ti 47	-0.78814(11)	1.00129(13)	1.001716	-	
23	V	23 V 50	+3.442(4)	1.00138(14)	1.001834	-	
		23 V 51	+5.1464(7)	1.00138(14)	1.001834	-	
24	Cr	24 Cr 53	-0.47431(7)	1.00146(15)	1.001956	-	
25	Mn	25 Mn 55	+3.4669(6)	1.00156(16)	1.002077	-	
26	Fe	26 Fe 57	+0.9064(7)	1.00165(17)	1.002203	-	
27	Co	27 Co 59	+4.615(25)	1.00175(18)	1.002332	-	
28	Ni	28 Ni 61	-0.74965(5)	1.00185(19)	1.002468	-	
29	Cu	29 Cu 63	+2.2259(4)	1.00196(20)	1.002611	-	
		29 Cu 65	+2.3844(4)	1.00196(20)	1.002611	-	
30	Zn	30 Zn 67	+0.87485(16)	1.00206(21)	1.002749	-	
31	Ga	31 Ga 69	+2.01502(6)	1.002044(31)	1.002899	-29	JCP 143 074301 (2015)
		31 Ga 71	+2.56033(9)	1.002044(31)	1.002899		
32	Ge	32 Ge 73	-0.87824(5)	1.001988	1.003031	-34	J Phys Chem A110 11462 (2006)
33	As	33 As 75	+1.4383(3)	1.00238(24)	1.003177	-	
34	Se	34 Se 77	+0.53356(5)	1.002447(15)	1.003327	-26	Mol Phys 111 1355 (2013)

Z	*Element*	*Reference* isotope(s)	*Adopted* Moment (nm) (see full Table)	*Diamagnetic* correction applied in this Table	*LFJ* Correction	*Correction* Adjustment (%) (Applied/LFJ–1)	*Diamagnetic* Correction Reference
35	Br	35 Br 79	+2.1046(6)	1.00261(26)	1.003479	-	
		35 Br 81	+2.2686(6)	1.00261(26)	1.003479	-	
36	Kr	36 Kr 83	-0.970730(3)	1.003577(3)	1.003635	-2	Magn Res Chem 52 430 (2014)
37	Rb	37 Rb 85	+1.35306(4)	1.00359(3)	1.003776	-5	CPL 532 1 (2012)
		37 Rb 87	+2.75129(8)				
38	Sr	38 Sr 87	-1.09316(11)	1.00353(11)	1.003950	-11	CPL 588 57 (2013)
39	Y	39 Y 89	-0.137298(5)	1.00326(4)	1.003950	-17	CPL 660 127 (2016)
40	Zr	40 Zr 91	-1.3022(4)	1.00321(32)	1.004282	-	
41	Nb	41 Nb 93	+6.1630(20)	1.00334(33)	1.004456	-	
42	Mo	42 Mo 95	-0.9132(3)	1.00348(35)	1.004633	-	
		42 Mo 97	-0.9324(3)	1.00348(35)	1.004633	-	
43	Tc	43 Tc 99	+5.6779(20)	1.00361(36)	1.004815	-	
44	Ru	44 Ru 99	-0.641(5)	1.00375(38)	1.005000	-	
		44 Ru 101	-0.718(6)	1.00375(38)	1.005000	-	
45	Rh	45 Rh 103	-0.08829(3)	1.00389(39)	1.005194	-	
46	Pd	46 Pd 105	-0.642(3)	1.00404(40)	1.005389	-	
47	Ag	47 Ag 107	-0.11352(5)	1.00419(42)	1.005586	-	
		47 Ag 109	-0.13051(5)	1.00419(42)	1.005586	-	
48	Cd	48 Cd 111	-0.5940(3)	1.00434(43)	1.005788	-	
49	In	49 In 113	+5.5208(4)	1.00451(6)	1.005994	-24	JCP 142 074301 (2015)
		49 In 115	+5.5326(4)	1.00451(6)	1.005994		
50	Sn	50 Sn 115	-0.9176(4)	1.00465(47)	1.006203	-	
		50 Sn 117	-0.9997(5)	1.00465(47)	1.006203	-	
		50 Sn 121	-1.0459(5)	1.00465(47)	1.006203	-	

Z	Element	Reference isotope(s)	Adopted Moment (nm) (see full Table)	Diamagnetic correction applied in this Table	LFJ Correction	Correction Adjustment (%) (Applied/LFJ–1)	Diamagnetic Correction Reference
51	Sb	51 Sb 121	+3.3580(16)	1.00481(48)	1.006419	-	
		51 Sb 123	+2.5457(12)	1.00481(48)	1.006419	-	
52	Te	52 Te 123	-0.7358(3)	1.00480(7)	1.006639	-28	Mol. P 111 1355 (2013)
		52 Te 125	-0.8870(5)	1.00498(50)	1.006639	-	
53	I	53 I 127	+2.8087(14)	1.00515(52)	1.006861	-	
		53 I 129	+2.6165(14)	1.00515(52)	1.006861	-	
54	Xe	54 Xe 129	-0.77796(2)	1.00733(10)	1.007092	3	Magn Res Chem 53 273 (2015)
		54 Xe 131	-0.69184(2)	1.00733(10)	1.007092		Magn Res Chem 53 273 (2015)
55	Cs	55 Cs 133	+2.5778(14)	1.00549(55)	1.007325	-	
56	Ba	56 Ba 135	+0.8381(2)	1.00685(21)	1.007564	-9	CPL 588 57 (2013)
		56 Ba 137	+0.9375(2)	1.00685(21)	1.007564		CPL 588 57 (2013)
57	La	57 La 139	+2.7791(2)	1.00636(5)	1.007811	-19	CPL 660 127 (2016)
58	Ce	none					no precise measurements
59	Pr	59 Pr 141	+4.266(3)	1.00626(63)	1.008341	-	
60	Nd	60 Nd 147	-1.063(5)	1.0065(7)	1.008616	-	
61	Pm	none					no precise measurements
62	Sm	62 Sm 147	-0.8090(14)	1.0069(7)	1.008897	-	
		62 Sm 149	-0.6677(11)	1.0069(7)	1.008897	-	
63	Eu	63 Eu 151	+3.4635(25)	1.0071(7)	1.009487	-	
		63 Eu 153	+1.5294(11)	1.0071(7)	1.009487	-	
64	Gd	64 Gd 155	-0.2591(4)	1.0073(7)	1.009789	-	
		64 Gd 157	-0.3398(6)	1.0073(7)	1.009789	-	
65	Tb	65 Tb 159	+2.009(4)	1.0076(7)	1.0101	-	
66	Dy	66 Dy 161	-0.479(3)	1.0078(8)	1.0104	-	
		66 Dy 163	-0.671(4)	1.0078(8)	1.0104	-	
67	Ho	67 Ho 165	+4.16(3)	1.0081(8)	1.0108	-	
68	Er	68 Er 167	-0.5623(4)	1.0083(8)	1.0111	-	

Z	*Element*	*Reference* isotope(s)	*Adopted* Moment (nm) (see full Table)	*Diamagnetic* correction applied in this Table	*LFJ* Correction	*Correction* Adjustment (%) (Applied/LFJ–1)	*Diamagnetic* Correction Reference
69	Tm	69 Tm 169	-0.2310(15)	1.0086(9)	1.0115		
70	Yb	70 Yb 171	+0.4923(4)	1.0089(9)	1.0118	-	
		70 Yb 173	-0.6780(6)	1.0089(9)	1.0118	-	
71	Lu	71 Lu 175	+2.2257(19)	1.0092(9)	1.0122	-	
72	Hf	72 Hf 177	+0.7910(9)	1.0095(10)	1.0126	-	
		72 Hf 179	-0.6389(14)	1.0095(10)	1.0126	-	
73	Ta	73 Ta 181	+2.365(4)	1.0098(10)	1.0130	-	
74	W	74 W 183	+0.11739(11)	1.0100(10)	1.0134	-	
75	Re	75 Re 185	+3.176(3)	1.0104(10)	1.0138	-	
		75 Re 187	+3.209(3)	1.0104(10)	1.0138	-	
76	Os	76 Os 187	+0.06442(7)	1.0107(11)	1.0143	-	
		76 Os 189	+0.6576(7)	1.0107(11)	1.0143	-	
77	Ir	77 Ir 191	+0.1502(6)	1.0110(11)	1.0147	-	
		77 Ir 193	+0.1630(6)	1.0110(11)	1.0147	-	
78	Pt	78 Pt 195	+0.6073(7)	1.0114(11)	1.0152	-	
79	Au	79 Au 197	+0.1452(2)	1.0118(12)	1.0157	-	
80	Hg	80 Hg 197	+0.5253(6)	1.0121(12)	1.0161	-	
		80 Hg 199	+0.5039(6)	1.0121(12)	1.0161	-	
		80 Hg 201	-0.5580(7)	1.0121(12)	1.0161	-	
81	Tl	81 Tl 203	+1.616(2)	1.0125(12)	1.0166	-	
		81 Tl 205	+1.632(2)	1.0125(12)	1.0166	-	
82	Pb	82 Pb 207	+0.5901(7)	1.0129(13)	1.0172	-20	Phys Chem Chem Phys 18 16483 (2016)
83	Bi	83 Bi 209	+4.093(5)	1.0133(13)	1.0177	-	
84	Po	none					no precise measurements
85	At	none					no precise measurements

Z	*Element*	*Reference* isotope(s)	*Adopted* Moment (nm) (see full Table)	*Diamagnetic* Correction in this Table	*LFJ* Correction	*Correction* Adjustment (%) (Applied/LFJ–1)	*Diamagnetic* Correction Reference
86	Rn	86 Ra 209	(+)0.8348(12)	1.0146(15)	1.0195		
87	Fr	87 Fr 210	+4.38(5)	no diamagnetic correction required			calculated hyperfine interaction.
88	Ra	88 Ra 225	-0.730(2)	1.0156(16)	1.0208	-	
89	Ac	none					no precise measurements
90	Th	none					no precise measurements
91	Pa	91 Pa 231	+1.99(2)	1.0173(17)	1.023	-	
92	U	none					no precise measurements
93	Np	none					no precise measurements
94	Pu	94 Pu 239	+0.202(4)	1.0188(19)	1.025	-	
95	Am	95 Am241	+1.60(3)	1.0195(20)	1.026	-	
		95 Am242	+0.3854(17)	1.0195(20)	1.026	-	
96	Cm	none					no precise measurements
97	Bk	none					no precise measurements
98		none					no data
99	Es	none					no precise measurements
100		none					no precise measurements
101		none					no data
102	no	none					no precise measurements

Appendix 3

EXPERIMENTAL METHOD ABBREVIATIONS

AB	Atomic beam magnetic resonance
AB/D	Atomic Beam Magnetic Resonance (direct moment measurement)
ABLDF	Atomic beam with laser double resonance detection
ABLFS	Atomic beam with laser fluorescence spectroscopy
ABLS	Atomic beam laser spectroscopy
β-NMR	NMR of in-beam polarized nuclei with beta asymmetry detection
β-NMR/OP	NMR of nuclei polarised by optical pumping with beta asymmetry detection
β-NNQR	Nuclear Quadrupole Resonance with beta detection
BFNO	Brute Force Nuclear Orientation
BFNMR/ON	Nuclear Magnetic Resonance on Brute Force Oriented Nuclei
CFBLS	Collinear Fast Beam Laser Spectroscopy - Accelerated Beam
CFBLS/β-NMR	Collinear Fast Beam Laser Spectroscopy: NMR with beta detection
CLS	Collinear Laser Spectroscopy
ENDOR	Electron-nuclear Double Resonance
EPR	Electron Paramagnetic Resonance
GCLS	Gas Cell Laser Spectroscopy
ISLS	In Source Laser Spectroscopy
LEMS	Level Mixing Spectroscopy
LMDR	Laser Microwave Double Resonance
LMR	Level Mixing Resonance on Oriented Nuclei
LRDRS	Laser RF Double Resonance Spectroscopy
LRFS	Laser Resonance Fluorescence Spectroscopy
LRIMS	Laser Resonance Ionisation Mass Spectroscopy
LRIS	Laser Resonance Ionisation Spectroscopy
LRS	Laser Resonance Spectroscopy
LRSRD	Laser Resonance Specroscopy with Radioactive Detection

MA	Microwave Absorption in gases
MB	Molecular Beam Magnetic Resonance
ME	Mossbauer Effect
M/N	Maser/Nuclear Magnetic Resonance frequency comparison
N	Nuclear Magnetic Resonance
NMR	Nuclear Magnetic Resonance
NMR/ME	Nuclear Magnetic Resonance detected using the Mossbauer Effect
NMR/ON	Nuclear Magnetic Resonance on Oriented Nuclei
NMR/ON(β)	Nuclear Magnetic Resonance on Oriented Nuclei with beta detection
NMR/ON(X)	Nuclear Magnetic Resonance on Oriented Nuclei with X-ray detection
NMR/OP	NMR detected using Optically Pumped Ions
NMR/OP(β)	NMR using Optically Pumped Ions with beta detection
NO/CP	Gamma Circular Polarisation measured from Oriented Nuclei
NO/ME	Mossbauer Effect on Oriented Nuclei
NO/S	Static Nuclear Orientation with gamma detection
NO/βS Static	Nuclear Orientation with beta detection
NO/D	Dynamic Nuclear Orientation
O	Optical Spectroscopy
OD	Optical Double Resonance
OGLS	Optogalvanic Laser Spectroscopy
OL	Optical Level Crossing
OP/β-NMR	Optical Pumping with NMR using beta detection
OP/RD	Optical Pumping with Radiative Detection
PMR	Paramagnetic Resonance
TIS	Trapped Ion Spectroscopy
TLS	Trap Laser Spectroscopy

Appendix 4

LITERATURE REFERENCE CODES

BASP Bull. Acad. Sci. USSR, Physical Series.

AnP Annalen der Physik

ARISKP Inst. fur Strahlen- und Kernphysik, Univ. Bonn Ann. Rpt. 83/84

ArkF Arkiv der Physik

BAPS Bulletin of the American Physical Society

Bk88 NFFS Nuclei far from stability AIP Conf. Proc. 164 Fifth Int. Conf. on Nuclei Far From Stability, Rosseau Lake, Canada, 1987. Ed I.S.Towner (Am. Inst.Phy., NY 1988)

CERN EP/87 51 CERN Report; 'Nuclear Radii and Moments of Unstable Isotopes' E.W. Otten and the ISOLDE Collaboration.

Cf69Mntr Proceedings Int. Conf.Props. of Nucl. States, Montreal (1969) Eds M. Harvey et al., (Univ Montreal Press 1969)

Cf93Bern Proc. 6th Int. Conf. on Nuclei Far From Stability, Bernkastel-Kues, 1992 Inst. Phys. Conf. Ser. 132.

Chin. Phys. Chinese Physics

CJP Canadian Journal of Physics

Chin. Phys. Lett Chinese Physics Letters

CPL Chemical Physics Letters

CzJP Czech Journal of Physics.

EPL Europhysics Letters

Eur Phys J European Physical Journal

HFI Hyperfine Interactions

HPAc Helvetica Physica Acta

IPNO-DR Report of Nuclear Physics Institute, 91406, Orsay, CEDEX, France

JCP Journal of Chemical Physics

JOSA Journal of the Optical Society of America

JP Journal of Physics (London)

JPCo Journal de Physique (Paris) Colloques

JPhysChem Journal of Physical Chemistry

JPJa	Journal of the Physical Society of Japan
JPJS	Journal of the Physical Society of Japan Supplement
JPPa	Journal de Physique (Paris)
NIMPR	Nuclear Instruments and methods in physics research
NP	Nuclear Physics
PCan	Physics Canada
Phca	Physica
PhMg	Philosophical Magazine
PL	Physics Letters
PPS	Proceedings of the Physical Society of London
PR	Physical Review
PRL	Physical Review Letters
PS	Physica Scripta
RMP	Reviews of Modern Physics
RSI	Review of Scientific Instruments
ThCasserb	B.R.Casserb, Thesis, Princeton Univ. 1968
UCRL	University of California Radiation Lab (Berkeley) Report
ZNat	Zeitschrift fur Naturforschung
ZP	Zeitschrift fur Physik

Nuclear Data Section
International Atomic Energy Agency
Vienna International Centre, P.O. Box 100
A-1400 Vienna, Austria

E-mail: nds.contact-point@iaea.org
Fax: (43-1) 26007
Telephone: (43-1) 2600 21725 Web:
http://nds.iaea.org