Atomic Data and Nuclear Data Tables 107 (2016) 1–139

Contents lists available at ScienceDirect

Atomic Data and Nuclear Data Tables

journal homepage: www.elsevier.com/locate/adt

Tables of E2 transition probabilities from the first 2^+ states in even–even nuclei

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HIGHLIGHTS

- Compilation of experimental transition probabilities or B(E2) values for the known first 2^+ states in even–even nuclei.
- Evaluation of B(E2) values, lifetimes and deformation parameters for 447 even–even nuclei.
- Extensive discussion on data evaluation policies and procedures.
- Nuclear shell model calculation of the first 2^+ states energies and B(E2) values in even–even nuclei.

ARTICLE INFO

Article history:
Received 14 August 2015
Received in revised form
2 October 2015
Accepted 2 October 2015
Available online 3 November 2015

Keywords:
B(E2)
First 2^+ states
$Z = 2 - 104$
Deformation
Evaluation
Nuclear data

ABSTRACT

Experimental results of E2 transition probabilities or B(E2) values for the known first 2^+ states in 447 even–even nuclei have been compiled and evaluated. The evaluation policies for the analysis of experimental data have been described and new results are discussed. The recommended B(E2) values have been compared with comprehensive shell model calculations for a selected set of nuclei, where such theoretical procedures are amenable. The present work was motivated by a rapid increase in the number of new B(E2) measurements for the first 2^+ states since the previous evaluation of such data by S. Raman et al. published in 2001. Future plans to investigate the systematics of B(E2)↑ values, and intercomparison of different experimental techniques to obtain these data are outlined.

Published by Elsevier Inc.

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http://dx.doi.org/10.1016/j.adt.2015.10.001
0092-640X/Published by Elsevier Inc.

Contents

1. Introduction

Measurements of the quadrupole collectivity of atomic nuclei started in the early 1950s. Such collectivity was extensively studied along the $N \sim Z$ or "valley of stability" region. In this region, many nuclear structure phenomena, such as nuclear shell closure, were identified and explained in the framework of the nuclear shell model [1,2]. With the advent of radioactive beam and isotope production techniques, scientists were presented with a unique opportunity to test nuclear models for neutron- and proton-rich nuclei. This approach produced many interesting and often unexpected results on the evolution of nuclear properties near the neutron and proton driplines [3].

To demonstrate the importance of B(E2) values in nuclear physics research and model development, we will consider nuclear "magic numbers" and their evolution along the nuclear chart. In stable nuclei, large gaps exist between nuclear shells when the proton or neutron number is equal to 2, 8, 20, 28, 50, 82, and 126 [1,4]. These gaps result in large transition energy values between the ground and first excited states, relatively low quadrupole collectivities and small neutron capture cross sections. The "magic numbers" and their values are not preserved; they evolve for unstable nuclei due to nuclear structure effects. Therefore, nuclear properties of the first excited 2_1^+ states in even–even nuclei provide important information on the evolution of nuclear properties and shell model studies. Accurate knowledge of these properties is necessary for continuing the development of nuclear model calculations and theoretical understanding of many interesting phenomena in the quantum world.

Another significant application of B(E2) evaluated data is for nuclear reaction model calculations. Precise values of quadrupole deformation parameters are essential for the Reference Input Parameter Library (RIPL) [5] and nuclear reaction model codes such as EMPIRE and TALYS [6,7], which are extensively used for ENDF evaluations [8–10]. Such evaluations are critically important for applications of nuclear data as the ENDF/B-VII.1 library [8] provides evaluated neutron cross sections for frequently-used nuclear science and technology codes GEANT and MCNP.

The importance of compilation and evaluation of E2 transition probabilities for even–even nuclei was recognized in the 1960s by P.H. Stelson and L. Grodzins at Oak Ridge National Laboratory. They produced the first compilation of B(E2) values for 2_1^+ states [11], which was then continued by S. Raman et al. [12,13]. Presently, this work proceeds under the auspices of the US Nuclear Data Program (USNDP). It began as periodic update of B(E2) values for the mass regions, where a large number of new experimental results became available. The first update of B(E2) values for Cr, Fe, Ni and Zn isotopes ($Z \sim 28$ region) has been recently published by the joint effort of NNDC, Brookhaven National Laboratory (BNL), McMaster and Central Michigan Universities [14]. This update supplied valuable feedback to our collaboration from the research community [15], which has helped to improve the quality of the present work. The detailed description of compilation and evaluation tools, procedures and results is given in the following sections.

2. Nuclear Databases used in the present work

Nuclear Science References (NSR) [16], Evaluated Nuclear Structure Data File (ENSDF) [17,18] and Experimental Unevaluated Nuclear Data List (XUNDL) [19] databases each played a crucial role in this project. A short description of the databases is presented below.

The NSR database [16] is the most comprehensive source of low- and intermediate-energy nuclear physics bibliographical information, containing more than 219,000 articles, mostly in peer-reviewed journals, since the beginning of nuclear science. It consists of primary (journals) and secondary (proceedings, lab reports, theses, private communications) references. The main goal of the NSR is to provide bookmarks for experimental and theoretical articles in nuclear science using keywords. NSR keywords are assigned to articles that contain results on atomic nuclei and masses, nuclear decays, nuclear reactions and other properties. Keywords are also used to build author and subject indexes, which allow users to search for articles by subject (Coulomb excitation, σ, B(E2), $T_{1/2}$, etc.) or author. This database is updated weekly and serves as a primary source of bibliographical information for the ENSDF database.

The ENSDF database [17,18] contains evaluated nuclear structure and decay data. An international network of evaluators [20] contributes to the database. For each nuclide, all known experimental data used to deduce nuclear structure information are included. Each type of experiment is presented as a separate dataset. In addition, there is a dataset of "adopted" level and γ-ray transition properties, which represent the evaluator's determination of the recommended values for these properties, based on all the available experimental data. Information in the database is regularly updated and most of this information is also published in Elsevier Nuclear Data Sheets journal as A-chain evaluations. Due to the large scope of the database, evaluation updates are often conducted on an ~10-year basis, with some nuclides updated more frequently.

The XUNDL database [19] contains compiled experimental nuclear structure data from current publications in the "ENSDF" format. In general, the information in a given XUNDL dataset comes from a single journal article, or from a set of closely-related articles by one group of authors. The information in the XUNDL database is often used in the updated ENSDF evaluations.

We primarily used NSR and XUNDL database content for the experimental data search. These searches were verified using the ENSDF database, previous evaluation of S. Raman et al. [13] and references from the original experimental papers.

3. Experimental B(E2) values

Experimental values of B(E2), τ and β_2 are compiled in Table 1. This table extends the list of the previously reported quantities by S. Raman et al. [13], and includes target, beam, beam energy and annotation where the beam energy exceeds the Coulomb barrier [21]. In general, Coulomb excitation and nuclear resonance fluorescence measurements list $0_1^+ \rightarrow 2_1^+$ transitions, while lifetime measurements list $2_1^+ \rightarrow 0_1^+$ transitions. A short review of the recent experimental results that motivated the current evaluation is presented below and provides summary of experimental activities in the last 10–15 years. It lists new nuclides, nuclear physics rationale, experimental techniques, theoretical calculations, laboratories, references, etc. The following data indicate strong international collaborations and broad popularity of quadrupole collectivity studies worldwide.

3.1. ^{6}He

A neutron-α-particle coincidence experiment was performed at Notre Dame University to study breakup of ^{6}He [2007Ko23], and a B(E2) value of 0.00054(7) e^2b^2 was deduced for breakup via the 2^+ excited state reaction channel. The measured collectivity is for the particle unbound state. These data are also model dependent due to Coulomb–nuclear interference effects.

3.2. ^{10,12}Be

Lifetimes 0.205 ± 5 (stat) ±7 (syst) ps and 2.5 ± 7 (stat) ±3 (syst) ps of the first 2^+ states in ^{10}Be and ^{12}Be have been measured using the Doppler shift attenuation method at Argonne National Laboratory [2009Mc02] and inelastic scattering at RIKEN [2009Im01], respectively. The former measurement provides a discriminating test of *ab initio* calculations of light nuclei. While the later result shows a large quadrupole strength in the ground state transition, providing further evidence on the disappearance of the $N = 8$ "magic number".

3.3. ^{10,16,18,20}C

To further test *ab initio* model predictions, the lifetime of the 2_1^+ state in ^{10}C has been precisely re-measured at Argonne using the Doppler shift attenuation method [2012Mc03] to be 0.219(12) ps. Four different measurements [2004Im01,2008Wi04,2008On02] helped to pin-point the recommended B(E2) value for ^{16}C at 0.00179(20) e^2b^2. The electric quadrupole transition from the first 2^+ state to the ground 0^+ state in ^{18}C was studied through a lifetime measurement by an upgraded recoil shadow method at RIKEN [2008On02]. The lifetime of the 2_1^+ state in the near-dripline nucleus ^{20}C was recently measured to be $9.8(^{+28}_{-30})$ ps at the Michigan State University (MSU) Cyclotron Laboratory [2011Pe21]. That measurement is consistent with the previous limit [2009El03].

3.4. ^{22,24}O

Recent inelastic scattering experiments provided model-dependent data on quadrupole deformation parameter values, β_2

of 0.24 and 0.26 for ^{22}O [2006El05,2006Be04], and 0.15(4) for ^{24}O [2012Ts03]. These data provide complementary experimental evidence for a new "magic number" $N = 14$.

3.5. ^{18,26,28,30}Ne

Quadrupole collectivity of neon isotopes has been extensively studied at RIKEN. ^{18}Ne collectivity was verified in a Coulomb excitation experiment (Coulex) [2006YaZV]. The measurement of the $2^+_1 \rightarrow 0^+_1$ transition in ^{30}Ne [2003Ya05] and confirmation of B(E2) values in ^{26,28}Ne [2007Gi06,2005Iw02] have helped to pin-point the boundary of the "island of inversion" or nuclear shell ordering along $Z = 10$. Finally, ^{28,30}Ne deformation lengths and parameters were extracted from the angle-integrated cross sections using distorted-wave calculations [2014Mi09].

3.6. ^{20,30,32,34}Mg

Investigation of nuclear shell closure effects in the "island of inversion" region served as an additional motivation for study of magnesium isotopes. Coulomb excitation of ^{20,34}Mg was performed at the RIKEN cyclotron facility [2008Iw04,2001Iw07]. The deduced B(E2)↑ value for ^{34}Mg of 0.0631(126) e^2b^2 is in agreement with the MSU measurements [1999Pr09,2005Ch66]. In addition, REX-ISOLDE Coulex B(E2)↑ values of 0.0241(31) and 0.0434(52) e^2b^2 in ^{30}Mg and ^{32}Mg [2005Ni11,2005NiZS], respectively, confirmed the previous MSU and RIKEN results [1999Pr09,1995Mo16]. Recently, complementary values of deformation lengths and parameters for the first 2^+ states in ^{32,34,36}Mg were measured at RIKEN [2014Mi09]. These deformation parameters provide a glimpse of quadrupole collectivity in the vicinity of ^{32}Mg. Finally, in 2015, the RIKEN group demonstrated that the electromagnetic properties of ^{32}Mg can be studied with Coulomb excitation at beam energies of a few hundreds of MeV/nucleon, where a thicker target can be used to increase the excitation yields [2015Li28].

3.7. ^{24,36,38,40}Si

The Coulomb excitation technique was used for the study of collectivity in the proton-rich nucleus ^{24}Si. The reduced transition probability from its 2^+_1 state was probed using a radioactive beam of ^{24}Si at 57.9 MeV/nucleon bombarding a ^{208}Pb target [2002Ka80]. This B(E2)↓ value of 19.1 ± 5.9 e^2fm^4 is smaller than that of the mirror nucleus ^{24}Ne. β_2 values of 0.25(4), 0.36(3), and 0.37(5) have been deduced for ^{36,38,40}Si, respectively, using inelastic proton-scattering cross sections at MSU [2007Ca35]. Enhanced collectivity at $N = 26$ indicates a reduced $N = 28$ shell gap at large neutron excess in this chain of isotopes.

3.8. ^{28}S

^{28}S was measured at RIKEN with the Coulomb excitation technique [2012To06]. The resulting B(E2) value of 181(31) e^2fm^4 is smaller than the expected value based on empirical B(E2) systematics. These results indicate the emergence of the "magic number" $Z = 16$ in the $|T_z| = 2$ nucleus ^{28}S.

3.9. ^{32,44,46,48}Ar

The collective strengths of the $0^{gs}_1 \rightarrow 2^+_1$ excitations in ^{32,48}Ar were measured at MSU using NaI- and SeGA- gamma detector arrays [2002Co09,2012Wi05]. The ^{32}Ar measurement, taken together with previously existing Coulomb excitation data for ^{32}Si [1998Ib01], yields the isoscalar and isovector multipole matrix elements for the transition between $T = 2$ states in the $A = 32$ system. Complementary Coulex and RDM measurements of ^{44,46}Ar were conducted at GANIL, France and Legnaro, Italy facilities [2009Zi01,2010Me07], respectively. These experiments addressed the development of deformation and shape coexistence in the vicinity of the doubly magic ^{48}Ca, related to the weakening of the $N = 28$ shell closure.

3.10. ^{40,42,44,46,48,50}Ca

Electric quadrupole strength distributions in doubly magic nuclei ^{40,48}Ca were studied using the resonance fluorescence technique at Darmstadt, Germany [2002Ha13]. The transient field technique was employed to study collectivity in ^{42,44,46}Ca at the Cologne tandem accelerator [2003Sc21,2003Sp04]. The ^{46}Ca g-factor [2003Sp04] is in disagreement with the large positive value predicted by the large scale shell model (LSSM) calculations which included *sd* shell core excitations into the *fp* shell and accounted well for the corresponding ^{42,44}Ca results [2003Sc21]. Both $g(2^+_1)$ and B(E2) in ^{46}Ca can be explained by full *fp*-shell model calculations using the FPD6 interaction without invoking core excitations. Lifetimes of the first excited state in ^{46,48}Ca were measured with the recoil distance method using the PRISMA–CLARA setup at Legnaro [2009Me23,2012Mo11]. The same facility has been employed to measure a lifetime of the first excited state of the $N = 30$ isotone, ^{50}Ca [2009Va06]. This extends the lifetime knowledge beyond the $f_{7/2}$-shell closure near the doubly magic nucleus ^{48}Ca.

3.11. ^{52,54,56,58}Ti

The even–even ^{52,54,56,58}Ti isotopes have been studied with intermediate-energy Coulex experiments at MSU and absolute B(E2) transition rates have been deduced [2005Di05]. These data confirm the presence of a subshell closure at neutron number $N = 32$ in neutron-rich nuclei above the doubly magic nucleus ^{48}Ca and do not support the predicted $N = 34$ closure. ^{52}Ti low-level structure properties were verified using an inverse kinematics reaction Doppler shift attenuation method at Köln (Cologne), Germany [2006Sp02]. Finally, the ^{58}Ti deformation length was recently probed at RIKEN, Japan [2013Su20]. The energy of the first 2^+ state and the deformation length value are comparable to the ones of ^{56}Ti, which indicates that the collectivity of the Ti isotopes does not increase significantly with neutron number until $N = 36$.

3.12. ^{46,56,58,60,62,64}Cr

To complete the systematics in the $N = Z = 28$ region, a B(E2; $0^+_1 \rightarrow 2^+_1$) value of 0.093(20) e^2b^2 has been reported from the intermediate-energy Coulex of ^{46}Cr [2005Ya26]. Coulomb excitation B(E2) values of 8.7(30) and 14.8(42) W.u. for ^{56,58}Cr, respectively, have been measured by the RISING collaboration [2005Bu29]. These results agree well with the shell model calculation based on GXPF1A and GXPF1 effective interactions [2005Ho32,2004Ho08]. B(E2) and lifetime values for the first 2^+ states of ^{58,60,62,64}Cr have been recently measured at MSU [2012Ba31,2013Cr02,2015Br10]. The deformation length and quadrupole deformation parameter have been studied in the inelastic scattering of ^{60,62}Cr on hydrogen [2009Ao01]. These data provide evidence for enhanced collectivity in chromium nuclei. Recently, quadrupole collectivity of neutron-rich ^{64}Cr was measured with the Coulex technique [2013Cr02]. Its deformation has been interpreted with shell-model calculations using the state-of-the-art LNPS effective interaction.

3.13. ^{50,52,62,64,66,68}*Fe*

A B(E2;$0_1^+ \rightarrow 2_1^+$) value of 0.140(30) e^{2}b^2 in ^{50}Fe has been reported from an intermediate-energy Coulex experiment [2005Ya26]. A Coulex measurement at MSU [2004Yu07] has produced a B(E2;$0_1^+ \rightarrow 2_1^+$) value of 0.082(10) e^{2}b^2 for ^{52}Fe. The increase in B(E2) strength with respect to the even-mass neighbor ^{54}Fe agrees with shell model calculations as the "magic number" $N = 28$ is approached. ^{62,64}Fe lifetimes of 7.4(9) and 7.4(26) ps [2010Lj01], have been originally reported by the GANIL group using the recoil-distance Doppler shift method after multinucleon transfer reactions in inverse kinematics. A recent MSU measurement of lifetimes provides the following results: 8.0(10), 10.3(10), 39.0(40) ps for ^{62,64,66}Fe [2011Ro02], respectively. The deduced B(E2) strengths demonstrate the enhanced collectivity of the neutron-rich Fe isotopes up to $N = 40$. Note that both groups used the plunger method. B(E2) values of 0.1445(124) and 0.1777(216) e^{2}b^2 for ^{66,68}Fe, respectively, have also been recently measured at MSU [2013Cr02].

3.14. ^{54,58,60,62,64,70,74}*Ni*

The Coulex technique was employed to deduce the B(E2) value for ^{54}Ni [2004Yu10,2005Ya26]. High-precision reduced electric-quadrupole transition probabilities have been measured from the single-step Coulomb excitation of semi-magic ^{58,60,62,64}Ni beams at 1.8 MeV per nucleon on a natural carbon target at the Holifield Radioactive Ion Beam Facility [2014Al20]. A reduced transition probability, B(E2;$0_1^+ \rightarrow 2_1^+$), of 0.086(14) e^{2}b^2 [2006Pe13] has been measured by Coulex for the neutron-rich nucleus ^{70}Ni in a ^{208}Pb target at intermediate energy. The current B(E2) value for ^{70}Ni is unexpectedly large, which may indicate that neutrons added above $N = 40$ strongly polarize the $Z = 28$ proton core. The deformation length and quadrupole deformation parameter have been measured by inelastic scattering of ^{74}Ni on hydrogen [2010Ao01]. Results of this experiment indicate that the magic character of $Z = 28$ or $N = 50$ is weakened in ^{74}Ni. The precision of this measurements was improved with Coulomb excitation techniques at MSU [2014Ma85].

3.15. ^{72,74,76,78,80}*Zn*

A reduced transition probability, B(E2;$0_1^+ \rightarrow 2_1^+$), of 0.174(21) e^{2}b^2 [2002Le17] for the ^{72}Zn nucleus has been measured by the Coulex technique at intermediate energy. This result is consistent with the expected values from the neighboring nucleus ^{73}Zn and indicates that the behavior of B(E2) strengths around the $N = 40$ sub-shell closure in Zn is very different from the Ni isotopic chains. A reduced transition probability B(E2;$0_1^+ \rightarrow 2_1^+$) of 0.204(15) e^{2}b^2 [2006Pe13] for the neutron-rich ^{74}Zn nucleus has been measured by Coulomb excitation on a ^{208}Pb target at intermediate energy. This result agrees well with 0.201(16) e^{2}b^2 which was measured at REX-ISOLDE [2007Va20]. Recent B(E2) measurements at GANIL and Legnaro facilities [2013Ce01,2013Lo04] highlight needs for additional systematics. The reduced transition probabilities, B(E2;$0_1^+ \rightarrow 2_1^+$), of 0.145(18), 0.077(19) and 0.073(9) e^{2}b^2 for ^{76,78,80}Zn have been reported by the REX-ISOLDE group [2007Va20,2009Va01] using the Coulex method at low-energy. Lifetimes of ^{70,72,74}Zn were deduced with the AGATA spectrometer demonstrator [2013Lo04]. These data are consistent with shell model predictions using JUN45 and LNPS effective interactions.

3.16. ^{64,66,70,76,78,80,82}*Ge*

Collectivity of germanium isotopes was extensively studied in the last ten years. A lifetime value of 3.3(5) ps for the $N = Z$ nucleus ^{64}Ge was measured with the recoil distance method at MSU [2007St16]. The last result is in excellent agreement with large-scale shell-model calculations applying the GXPF1A interactions. Recent lifetime measurements in ^{66}Ge [2013Co23,2012Lu03] indicate potential problems with the original measurement [1979Wa23]. A low-level structure of ^{70}Ge was investigated at Munich tandem with the Doppler shift attenuation technique [2006Le31]. Complementary B(E2) values for a ^{76}Ge primary beam were deduced and used for calibration of secondary fragment values at MSU, GANIL, and Legnaro [2005Di05,2006Pe13,2013Lo04]. Reduced transition probabilities in ^{78,80,82}Ge were investigated at RIKEN, Oak Ridge, and MSU [2005Iw03,2005Pa23,2010Ga14]. The B(E2) systematic trend approaching $N = 50$ indicates strong sensitivity of its values to the effective interaction.

3.17. ^{68,70,72,82,84}*Se*

Recently B(E2) values have been deduced from the Coulomb excitation of ^{68,82,84}Se at MSU and RIKEN [2009Ob02,2005Iw03, 2010Ga14]. It was found that the ^{68}Se transition strength is similar to that of the triaxial ^{64}Ge nucleus [2007St16]; in sharp contrast to the much stronger collectivity observed for the oblate ^{72}Kr nucleus [2005Ga22]. Meanwhile, a ^{84}Se measurement [2010Ga14] has helped to complete the B(E2) systematics for the $N = 50$ isotones from zinc to molybdenum. ^{70,72}Se lifetimes were measured with the recoil-distance method at Legnaro [2008Lj01]. The Legnaro results reveal considerable discrepancies with the literature values [1986He17]. The HFB-based configuration-mixing calculations indicate an oblate rotational ground-state band in ^{68}Se [2008Lj01]. The collectivity in ^{68,70}Se was recently verified at MSU using the recoil distance Doppler shift technique [2014Ni09]. This trend is consistent with shell model calculations using the GXPF1A interaction in an *fp*-model space including the Coulomb, spin–orbit and isospin non-conserving interactions.

3.18. ^{72,74,76,78,88,90,92,94,96}*Kr*

A B(E2)↑ value of 0.4997(647) e^{2}b^2 for the $N = Z$ nucleus ^{72}Kr was measured with the Coulex technique at MSU [2005Ga22]. This value is in agreement with the self-consistent models that predict an oblate shape for the ground state of ^{72}Kr. Quadrupole collectivity of ^{74,76,78}Kr was studied with the Coulomb excitation and recoil distance methods. The ^{74,76}Kr results [2005Go43] resolve discrepancies between lifetime and Coulomb excitation measurements. A series of ^{78}Kr measurements [2005Ga22,2006Be18,2009Ob02] agree well with one another. A GRETINA array lifetime measurement of ^{72,74}Kr [2014Iw01] agrees with the previous values [2005Ga22,2005Go43] and indicates a future potential use of this detector. Results for ^{88,92}Kr were reported at a recent conference [2009MuZW], and may require further experimental work. The ^{90}Kr lifetime was measured by cold-neutron-induced fission of ^{235}U [2014Re15]. B(E2) values of 0.247(28) and 0.436(93) e^{2}b^2 for ^{94,96}Kr, respectively, were measured with Coulex at the CERN REX-ISOLDE facility [2012Al03]. This measurement helped to clarify energies of the first excited states and the erroneous statements on sudden onset of deformation in ^{96}Kr.

3.19. ^{76,78,84,86,88,96}*Sr*

The lifetimes of the first excited states in ^{76,78}Sr and ^{84,86,88}Sr were measured with the Doppler shift attenuation technique at MSU [2012Le05] and Yale [2012Ku14], respectively. The former results highlight the importance of the mixing of coexisting shapes for the description of well-deformed nuclei, and the latter data are consistent with the large-scale shell-model calculations using the JUN45 interaction. The B(E2) value of ^{96}Sr was measured in a Coulex experiment at the REX-ISOLDE facility [2011Cl03]. The combination of a rather large B(E2) value with a large spectroscopic quadrupole moment in ^{96}Sr suggests a quasi vibrator character and excludes static quadrupole deformation. These results are reproduced with Gogny D1S force calculations.

3.20. $^{88,92,96,104,106}Zr$

Lifetimes of 3.6(4) and 0.82(10) ps for the first 2^+ states in ^{88,96}Zr, respectively, were measured at Yale with the Doppler shift attenuation method [2012Ku14,2003Ku11]. These data are in fair agreement with shell-model calculations. ^{92}Zr collectivity was investigated at Darmstadt and Köln [2013Sc01,2002We15]. A combination of experimental data and shell model calculations shows that both, single particle and collective degrees of freedom are present in ^{92}Zr. The first excited state lifetime in ^{104}Zr was deduced to be 2885(435) ps at Argonne by employing a ^{252}Cf(SF) decay technique [2006Hw01]. This experiment indicates that ^{104}Zr has one of the most deformed 2^+ state among medium and heavy even–even nuclei. The deformation can also be reproduced with HFB calculations. Fast timing in beta decay results were published recently for ^{104,106}Zr [2015Br13].

3.21. $^{106,108}Mo$

The ^{106}Mo lifetime of 173(14) ps was deduced at Lawrence Berkeley National Laboratory with a delayed coincidence (DC) technique [2006Hw01]. This result helped to resolve ambiguities in previous measurements. The previously discussed preliminary results have helped to shed more light on ^{106,108}Mo [2015Br03].

3.22. $^{96,98,106}Ru$

Lifetimes of ^{96,98}Ru were extracted with the Doppler shift attenuation technique at Köln [2002Kl07] and Yale [2012To01, 2012Ra03]. The Köln measurement is well reproduced with shell model calculations, and the Yale experimental ratio of $4^+/2^+$ transition strengths agrees well with the vibrational character of the low-energy excitations in ^{98}Ru. A time-delayed technique at Jyvaskyla, Finland was used to deduce a lifetime of 249(5) ps in ^{106}Ru [2008Sa05]. This value is consistent with the General Collective Model and Interacting Boson Approximation (IBA) calculations.

3.23. $^{98,100,110,114}Pd$

The recoil distance method (RDM) was employed at Köln to set a lifetime limit of $<$16.3 ps for ^{98}Pd [2009FrZZ] and a value of 9.0(4) ps for ^{100}Pd [2009Ra28]. The ^{98}Pd nucleus is not very collective due to its closeness to doubly-magic ^{100}Sn, and ^{100}Pd is well reproduced by shell model calculations. The Yale RDM value [2012An17] is rather preliminary in nature, and was excluded from the evaluation process. The identical technique was used at MSU to deduce lifetimes of 67(8) and 118(20) ps for ^{110,114}Pd nuclei, respectively [2008De30]. The new B(E2) values are described in the framework of the Interacting Boson Model (IBM), and ^{114}Pd data fit nicely into the systematic trends deduced from the lighter Pd isotopes.

3.24. $^{100,102,104,110,122,124,126}Cd$

Coulomb excitation and recoil distance techniques were used to measure excitation strength in ^{100,102,104}Cd [2009Ek01,2007Bo17, 2001Li24]. These data could be described within the shell-model using realistic matrix elements obtained from a G-matrix renormalized CD-Bonn interaction. The recoil distance Doppler shift technique was used to deduce a lifetime of 8.7(12) ps in ^{110}Cd at Köln [2001Ha09]. The E2-transition probabilities in ^{110}Cd are in rather good agreement with the predictions of the U(5)-limit of the IBM-1. The REX-ISOLDE collaboration employed the Coulex technique to deduce B(E2) values in ^{122,124,126}Cd [2014Il01]. These data agree well with other preliminary results [2006KrZV,2008KrZZ], and clarify the onset of collectivity in the vicinity of the $Z = 50$ and $N = 82$ shell closures.

3.25. $^{104,106,108,110,112,114,116,118,120,122,124,126,128,130,132,134}Sn$

Quadrupole collectivity of even-A tin isotopes was extensively studied during the last decade. The intermediate-energy Coulomb excitation technique was used to deduce the B(E2) value in ^{104}Sn [2013Ba57,2014Do19]. Both results are consistent, and show the enhanced collectivity below the midshell, approaching $N = Z = 50$. These results disagree with the modern many-body calculations. The same technique was used to measure B(E2) values in ^{106,108,110}Sn at GSI RISING, MSU, and REX-ISOLDE at CERN [2005Bb09,2007Va22,2008Ek01,2008EkZZ]. These results show that the transition strengths for these nuclei are larger than predicted by current state-of-the-art shell-model calculations. For spectroscopic purposes, ^{112,114}Sn nuclei were re-measured at MSU, and IUAC in New Delhi, India [2007Va22,2010Ku07,2011Ku05]. Precise measurements of the first 2^+ excited states lifetimes in ^{112,114,116,122}Sn and B(E2) values in ^{116,118,120,124}Sn were conducted with the Doppler shift attenuation technique at GSI and Australian National University, respectively [2011Ju01]. For the isotopes ^{112,114,116}Sn, the E2 transition strengths, deduced from the measured lifetimes, are in disagreement with the previous values and indicate a shallow minimum at $N = 66$. A series of Coulomb excitation and Doppler shift attenuation measurements were conducted at Oak Ridge National Laboratory to measure collectivity in ^{124,126,128,130,132,134}Sn, employing carbon and titanium targets [2012Ku24,2011Al25,2004Ra27,2005Va31]. The Oak Ridge data were compared to large-scale shell-model and quasiparticle random-phase calculations. The shell model predictions are consistent with a generalized-seniority scheme, which predicts relatively constant 2_1^+ energies and a parabolic trend in the matrix elements for $A = 102$–130.

3.26. $^{108,112,114,118,120,122,128,130,132,134,136}Te$

The lifetime of the first excited 2^+ state in ^{108}Te has been measured, using a combined recoil decay tagging and recoil distance Doppler shift technique at Jyvaskyla (JYFL), Finland [2011Ba37]. In contrast to the earlier results for the light tin isotopes, ^{108}Te does not show any enhanced transition probability with respect to the theoretical predictions and the tellurium systematics. The lifetime in the neutron-deficient nucleus ^{112}Te has been measured using the DPUNS plunger and the recoil distance Doppler shift technique [2015Do04]. ^{114}Te lifetimes were determined using the recoil distance Doppler-shift technique with a plunger device at Köln [2005Mo20]. The energy spectrum of ^{114}Te is a slightly anharmonic vibrator, however, the obtained B(E2) values are in strong contradiction with the theoretical predictions of the U(5) limit of IBM. Lifetimes of excited states in ^{118}Te have been measured using the Doppler Shift Attenuation method (DSAM) and Recoil Distance method (RDM) at the Niels Bohr Institute in Denmark [2002Pa19]. The excitation energies and B(E2) values are satisfactorily interpreted in the framework of IBM. ^{120}Te was recently studied at Yale with a plunger device and inverse kinematics Coulomb excitation with heavy beams [2010We12], and at IUAC, New Delhi by DSAM [2014Sa49]. ^{122}Te excitations have been investigated using γ-ray spectroscopy following inelastic neutron scattering at Kentucky [2005Hi04]. The energies of low-lying levels of tellurium are described by the IBM. ^{126,128,130,132}Te collectivities were measured with time correlation between fission fragments and γ-rays at Grenoble [2001Ge07]. Independently, B(E2) values of ^{132,134,136}Te were studied with Coulomb excitation at Oak Ridge [2002Ra21], and explained within the shell model formalism. The results of this measurement were further re-analyzed by the Oak Ridge group and updated values were published in a subsequent measurement publication [2011Da21]. Complementary B(E2) values in ^{130,132,134}Te were determined through Coulomb excitation in inverse kinematics [2003Ba01]. This led to the extension of systematics of experimental quadrupole collectivities from the ground state to the first excited state to the $N = 82$ shell closure.

3.27. ^{114,124,126,128,130,132,134,138,140,142,144}Xe

Quadrupole collectivity in ^{114}Xe was studied using the 4π spectrometer, EUROBALL IV and Cologne plunger device [2002De26], then explained with a total Routhian surfaces calculation. As a first test of SeGA Ge-array, the MSU group has conducted a Coulex experiment at the Argonne tandem [2006Mu04] to study ^{124,126,128,130,132,134}Xe. These results agree well with the previously published data. Preliminary values for the B(E2) values in ^{138,140,142,144}Xe were deduced using the Coulex technique and MINIBALL Ge-array [2007Kr12,2007Kr19,2008KrZZ]. The ^{140}Xe value agrees well with a previously published measurement [1999Li18], while the ^{138}Xe experimental value exceeds that predicted by the quasiparticle random phase approximation.

3.28. ^{122,136,140}Ba

^{122}Ba lifetime was studied with RDM using the Cologne plunger device [2010Bi11]. The corresponding B(E2) value agreed with the predictions of the X(5) model and calculations performed in the framework of the IBA-1 and IBA-2 models. A ^{136}Ba stable beam Coulex measurement at Oak Ridge yielded a reduced transition probability of 0.46(4) e^{2}b^2 [2002Ra21]. The transition probability is in agreement with the adopted value [13]. A B(E2) value and lifetime of $0.484(^{+38}_{-101})$ e^{2}b^2 and $10.4(^{+22}_{-8})$ ps, respectively, were measured at REX-ISOLDE and MINIBALL setup at CERN using ^{140}Ba particle beams [2012Ba40]. The present result agrees with predictions of Monte Carlo shell-model and energy density functional calculations.

3.29. ^{148,152}Ce

A ^{252}Cf(SF) radioactive source and the Gammasphere array were employed to measure lifetimes of 130(43) and 360(24) ps in ^{148,152}Ce [2006Hw01,2005Fo17], respectively. The ^{148}Ce lifetime is marginally lower but still consistent with the previously reported values, while ^{152}Ce was measured for the first time.

3.30. ^{136,140}Nd

A relativistic Coulex technique was employed to deduce a B(E2) strength of 80(11) W.u. in ^{136}Nd at Darmstadt [2008Sa35]. The comparison with the asymmetric rotor and the Geometrical Collective Model (GCM) yields information on the nuclear shape, quadrupole deformation parameters, and indicates γ-softness of the $N = 76$ isotone. A low-energy Coulex experiment was used to deduced a B(E2)↑ value of 0.72(5) e^{2}b^2 in ^{140}Nd using the Miniball array at the REX-ISOLDE-CERN facility [2013Ba38]. The quasiparticle phonon and large-scale shell model calculations of $N = 80$ isotones could not reproduce an E2 strength enhancement in ^{140}Nd.

3.31. ^{140,142,152}Sm

Lifetime of the first 2$^+$ excited state at 530.7 keV was measured from recoil-distance Doppler shift method [2015Be25] at the Heavy Ion Laboratory of the University of Warsaw. The Coulomb excitation technique was used to investigate evolution of quadrupole collectivity in ^{142}Sm [2015St08]. A recent in-flight fast-timing measurement of the ^{152}Sm lifetime [2014Pl01] agrees well with the ENSDF recommendation.

3.32. ^{138,148,160,162,164}Gd

The first excited state lifetime, 308(17) ps, for ^{138}Gd was confirmed using RDM with the Cologne plunger at the Jyvaskyla facility [2011Pr10]. The excitation energies in ^{138}Gd can be reproduced with X(5) critical-point calculations, however, large experimental B(E2) uncertainties cannot rule out contributions from rotational and vibrational modes of excitation. The same technique was applied to measure a lifetime of 6.0(19) ps in ^{148}Gd using the EUROBALL array [2003Po02], and results were reproduced with shell model calculations. ^{148}Gd has the smallest B(E2) value among the $N > 82$ nuclei in the region. Lifetimes in ^{160,162,164}Gd were recently measured using a β-γ timing technique at JAEA [2010NaZY]. These results suggest that the deformation of nuclear shape would be enhanced at $N = 98$.

3.33. ^{156}Dy

To test the X(5) model, the lifetime for ^{156}Dy was measured to be 106(15) ps with the recoil distance Doppler-shift method using the Cologne coincidence plunger apparatus at Legnaro [2006Mo22]. A fit of the data using the general collective model suggests contribution of a deeper collective potential.

3.34. ^{158,170}Er

A lifetime of 341(10) ps for ^{158}Er was measured with the recoil distance technique and the Gammasphere array [2002Sh09]. This result is consistent with the previous measurement [1986Os02] and was reproduced using Ultimate Cranker model calculations. The Coulex technique was used to deduce properties of ^{170}Er at Legnaro [2011Di07]. The reduced matrix elements extracted with the Coulomb excitation code GOSIA are in agreement with collective model predictions.

3.35. ^{168,170,172,174,176}Hf

Preliminary values of the lifetimes for the first 2$^+$ states in ^{168,172}Hf, were measured using the delayed-coincidence technique at Yale [2011We08,2010We12] to be 1237(10) and 2655(79) ps, respectively. The results for ^{168}Hf and ^{172}Hf are in agreement and slightly higher than ENSDF adopted values, respectively. These results and the transition strengths in ^{174,176}Hf were tested at the university of Cologne [2011ReZZ,2015Ru03]. A lifetime of 1740(60) ps for ^{170}Hf was deduced at the Stony Brook University TANDEM-LINAC facility with the help of a pulsed beam technique [2006Co20]. The corresponding E2 transition rate follows the expected trend and empirically confirms the correlation between deformation and the filling of major shells. An extended e$^-$-e$^-$ lifetime measurement of ^{174}Hf has been performed at the Cologne Tandem Van-de-Graaff accelerator [2009Re20]. This measurement suggests a value lower than previously reported.

3.36. $^{172,174,176,178,188}W$

The first excited 2^+ state lifetimes of 970(29), 1431(9), and 1642(21) ps in ^{172,176,178}W, respectively, were measured in fast timing experiments using conversion electron spectroscopy at Köln [2010Ru12,2009Re20]. IBM calculations reproduce systematics of energy levels for the tungsten isotopes, however, transition rates could only be satisfactorily reproduced with individual adjustments of the effective charge. The preliminary value of the ^{174}W lifetime was deduced using a DC technique at Yale [2011We08]. The IFIN-HH, Romania facility was used to measure a lifetime of 1255(173) ps in ^{188}W with a fast-timing technique [2013Ma66]. This result, in combination with systematics and Woods–Saxon potential energy surface calculations, suggests a prolate deformed minima with rapidly increasing γ-softness for tungsten isotopes.

3.37. $^{174,176,178,180,188,190}Os$

The first excited 2^+ state lifetime of 513(20) ps in ^{174}Os was measured with a DC technique at the China Institute of Atomic Energy [2012Li50]. The low uncertainty makes this value sufficiently precise to serve as a normalization parameter for meaningful tests of nuclear models. The DC technique was also employed to deduce the lifetimes of ^{176,178,180}Os at Köln [2005Mo33]. Data for the even–even osmium isotopes transition strengths show a maximum value at the $N = 104$ midshell that corresponds to the simple expectation of the $N_\pi N_\nu$ rule of the IBA. Lifetimes of 930(140) and 540(36) ps in ^{188,190}Os, respectively, were measured with the recoil distance technique at Yale [2001Wu03]. The measured lifetimes confirm the E2 properties derived from prior heavy-ion induced Coulomb excitation experiments [1996Wu07]. The previously known ^{190}Os lifetime was verified at the IFIN-HH facility [2012MaZP].

3.38. $^{178,182,186,196}Pt$

The lifetime of the 2_1^+ state in ^{178}Pt was measured by using fast-timing techniques with the high-purity Ge and $LaBr_3$ scintillator at the China Institute of Atomic Energy [2014Li45]. The first excited 2^+ state lifetime of 590(102) ps in ^{182}Pt was measured with RDM at Köln [2012Gl01]. Calculations within the IBM and the GCM indicate shape coexistence in ^{182}Pt. This is consistent with the previous measurement lifetimes of 709(43) and 318(24) ps in ^{182,186}Pt, which were deduced using the same method at the ATLAS facility [2012Wa16]. The experimental lifetime value in ^{196}Pt has been revisited recently [2015Jo01].

3.39. $^{180,182,184,186}Hg$

The first excited 2^+ state lifetimes of 17.5(25) and 41(3) ps in ^{180,182}Hg were measured with RDM at Jyvaskyla [2009Gr09]. These results support the shape coexistence of weak prolate and intruding prolate structures in neutron-deficient Hg nuclei. ^{184,186}Hg lifetimes were measured using the recoil distance Doppler-shift method using the Köln plunger device [2014Ga04]. These more precise lifetime values have been used in the analysis of Coulomb excitation of ^{182,184,186,188}Hg measurements at the REX-ISOLDE facility [2014Br05]. Further analysis of properties of the low-lying states in $^{182-188}$Hg indicates a partial agreement with beyond mean field and IBM-based models and a possible interpretation within a two-state mixing model.

3.40. $^{186,188,208}Pb$

Lifetimes of prolate intruder states in ^{186,188}Pb were measured with RDM at Jyvaskyla [2008Gr04]. Reduced transition probabilities, derived from the measured lifetimes confirm the high collectivity of the intruder states in this region, and shed more light on shape coexistence typical for the nuclei near $Z = 82$ and $N = 104$. A lifetime of 0.00147(10) ps and B(E2)↑ value of 0.25(6) e^2b^2 in ^{208}Pb were deduced with nuclear resonance fluorescence technique at Darmstadt [2003En07] and the NIAIS, Japan [2008Sh23], respectively. The latter result was compared with an estimation of self-consistent random phase approximation using a semi-realistic interaction.

3.41. $^{194,196,198,200,202}Po$

The first excited 2^+ state lifetimes, 37(7) and 11.6(15) ps, in ^{194,196}Po, respectively, were measured with RDM at Jyvaskyla [2008Gr04,2009Gr08]. Self-consistent mean-field calculations suggest that oblate intruder states in ^{194}Po could dominate the ground state. A calculated collectivity in ^{196}Po, considerably smaller than the experimental value of 47(6) W.u., indicates a contribution from the intruder structures. E2 matrix elements for ^{196,198,200,202}Po have been extracted at Leuven with GOSIA analysis [2015KeZZ]. The values of nuclear matrix elements hint towards mixing of a spherical structure with a weakly-deformed rotational structure.

3.42. $^{202,204,220}Rn$

Shape coexistence in ^{202,204}Rn [2015Ga19] has been studied at CERN. The same facility also measured a B(E2)↑ value of 1.88(11) e^2b^2 in the 'octupole deformed' or distorted pear-shaped nucleus ^{220}Rn [2013Ga23].

3.43. ^{224}Ra

In another pear-shaped nucleus, ^{224}Ra, quadrupole collectivity was investigated in the same work at CERN [2013Ga23]. Its B(E2)↑ value of 3.96(12) e^2b^2 provides evidence for a stronger octupole deformation than in ^{220}Rn.

4. B(E2)↑ evaluation policies

The current evaluation represents the recommended values of B(E2)↑ in e^2b^2, mean lifetimes (τ) in picoseconds (ps) and deformation parameters (β_2) for the first 2^+ states in $Z = 2$–104, even N nuclei. These quantities are mutually related:

$$\tau = 40.81 \times 10^{13} E_\gamma^{-5} [B(E2) \uparrow /e^2b^2]^{-1} (1 + \alpha_T)^{-1} \tag{1}$$

$$\beta_2 = (4\pi/3ZR_0^2)[B(E2) \uparrow /e^2]^{1/2}, \tag{2}$$

where E_γ and α_T are the γ-ray energy in keV and the total conversion electron coefficient, respectively, and $R_0^2 = (1.2 \times 10^{-13}\ A^{1/3}\ \mathrm{cm})^2$. To introduce an additional measure of collectivity for nuclear excitations, Weisskopf units (W.u.) are added. Transition quadrupole moment values Q_0 in barns (b) are not included in the current evaluation, however can be deduced from the presented work

$$Q_0 = [16\pi B(E2) \uparrow /5e^2]^{1/2}. \tag{3}$$

All the measured values can be organized using three classes of experimental techniques:

- Model-independent or traditional types of measurements [13]: transmission Doppler-shift attenuation lifetime (TDSA), recoil distance Doppler-shift (RDM or RDDS), delayed coincidences (DC or TCS), low-energy and intermediate-energy Coulomb excitation (CE) and nuclear resonance fluorescence (γ, γ').
- Low model-dependent: electron scattering (E,E'), hyperfine splitting.
- Model-dependent: inelastic scattering of light and heavy ions (IN-EL).

4.1. B(E2)↑ Evaluation Procedure

This evaluation is based on the analysis of results from 2579 quadrupole collectivity measurements and 1273 experimental references. The literature cut-off date is September 2015. This number includes 120 pre-2000 experimental references that were not listed in the previous compilation of S. Raman [13]. These data span more than sixty years, and experimental techniques have evolved over time. It is worth noting that in the older measurements results may have been affected by the lack of side-feeding corrections, and the newer measurements should take precedence. The evaluation procedure for deducing the adopted (recommended) B(E2)↑ values is presented below:

- Compile a list of experimental B(E2)↑, ↓ or W.u., τ and β_2 values as reported in the original papers. Reported values depend on the measured quantities and are deduced from experimental data in the offline analysis.
- Convert experimental values into B(E2)↑ in e^2b^2.
- Analyze B(E2)↑ values. In a few of the older results, where uncertainties were not quoted by the authors, we have taken the values as adopted by Raman et al. [13]. The experimental values listed in Table 3, with the original uncertainties as quoted by the authors (not adjusted for evaluation purposes).
- Round uncertainties to two (rarely three) significant digits.
- Accept asymmetric uncertainties, if necessary.
- Direct communication with authors in discrepant cases, if possible.
- Deduce B(E2)↑ recommended values using model-independent or traditional, combined (model-independent and low model-dependent) and model-dependent datasets with the visual averaging library software package [22] using the selected datasets.

4.2. Asymmetric uncertainties

In this work, evaluated B(E2)↑ values are deduced from the measured values of B(E2), mean lifetime, and, in rare cases, deformation parameters. Note that the first two quantities are inversely dependent. Previous evaluations of S. Raman et al. [12,13] contain two different treatments of central values and uncertainties. Originally, S. Raman et al. [12] used a standard mathematical procedure to convert a particular τ value to the corresponding B(E2)↓ value. Later, this procedure was changed in favor of converting the central τ value [13] to a value between the upper and lower bounds, by extracting the mean of the two values and assigning an uncertainty so that the value overlapped the two bounds. This treatment produced symmetric uncertainties, however the original lifetime values could not be directly reproduced from the modified B(E2)↑ central values. To resolve this discrepancy, we kept central values and accepted asymmetric uncertainties that arise from the inverse dependence described above. In addition, original measurements may contain asymmetric uncertainties due to particular experimental conditions and analyses.

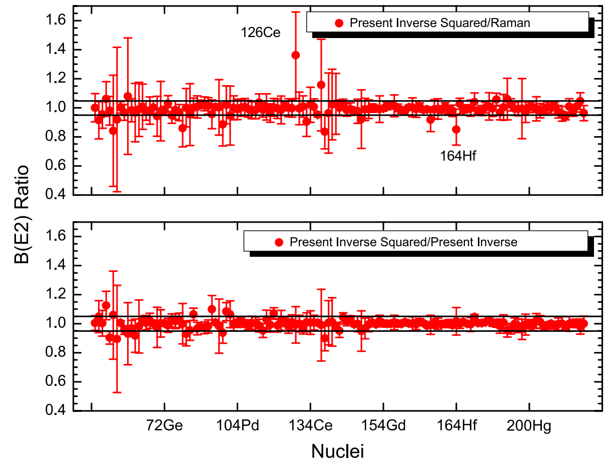

Fig. 1. The ratio of the present B(E2) values to Raman's evaluation and inverse squared to inverse (linear) averages for 135 nuclides are shown in the upper and lower panels, respectively. The majority of calculated values lie within a ±5% band near unity.

4.3. A brief review of the previous results

Consistency between the present results and the work of S. Raman et al. [13] is an important issue. The authors of Ref. [13] indicate: "Where several B(E2)↑ values are available for a given nuclide, we have generally used weighting values that are inversely proportional to the quoted uncertainty rather than inversely proportional to the square of the quoted uncertainty, which would be the correct procedure if the uncertainties were purely statistical. We believe that our weighting procedure results in a more reliable average value. We did not, however, adhere religiously to the weighting procedure outlined above in all cases."

We do not know the exact course of action taken by S. Raman and his collaborators for the evaluation of B(E2) values in each particular case. However, in the present work we rely on the general statistical and uncertainty handling procedures employed in nuclear data evaluations such as in the ENSDF database, or in Particle Data Project [23], and employ the Visual Averaging Library code [22] where weighting values are inversely proportional to the square of the quoted uncertainty. To check the validity of S. Raman's claim to have used an inverse weighting procedure, we developed a custom extension for the Visual Averaging Library that produces values using averaging weights which are inversely proportional to the quoted uncertainty. This approach is also used to make an overall consistency check as described below between our results and those in Raman et al. [13] where no new experimental values are available.

In this work, we have selected 135 nuclides where no new measurements have been reported since the previous evaluation, and B(E2)↑ value for each nuclide value was measured at least twice. The ratio of these data are shown in the upper panel of Fig. 1. The majority of the B(E2)↑ values are within 5% agreement. Notable deviations from unity in ^{126}Ce and ^{164}Hf are due to missing data and adoption by Raman of the earliest results, respectively.

To extend this analysis we calculate both the inverse squared and inverse B(E2)↑ averages for these nuclides. A comparative analysis of the current inverse squared, current inverse, and Raman's B(E2)↑ results for Z = 2–104 isotopes is shown in Table 2 and Fig. 1. The data analysis indicates that we have a good agreement between the present inverse squared averages and Raman's values, and the inverse averaging often results in comparable values with the corresponding inverse squared averages values. These facts and comments in the table clearly indicate that S. Raman et al. [13] were not following their practice of linear weighting consistently.

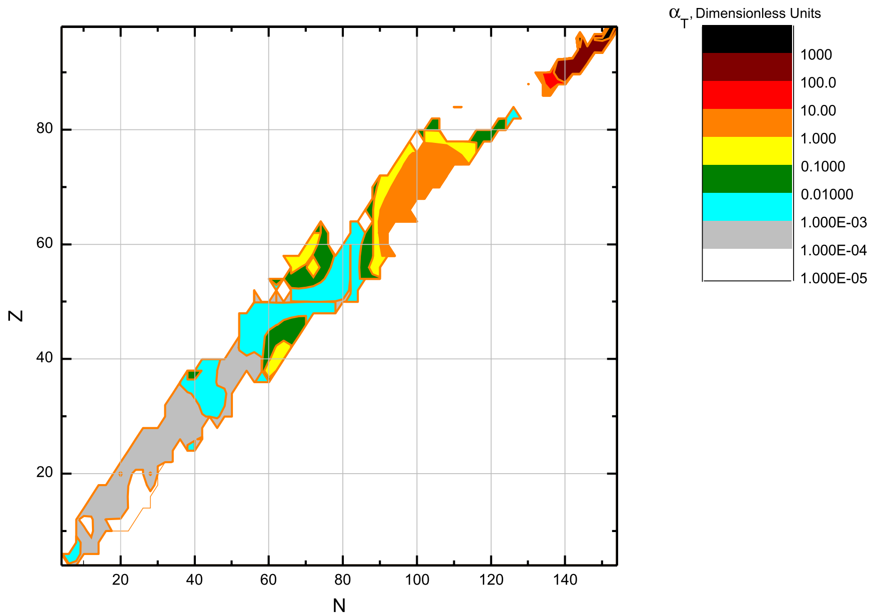

Fig. 2. Total conversion coefficients (α_T) for even–even $Z = 2$–104 nuclei. The coefficients have been deduced using the frozen orbital (FO) version of the BrIcc code.

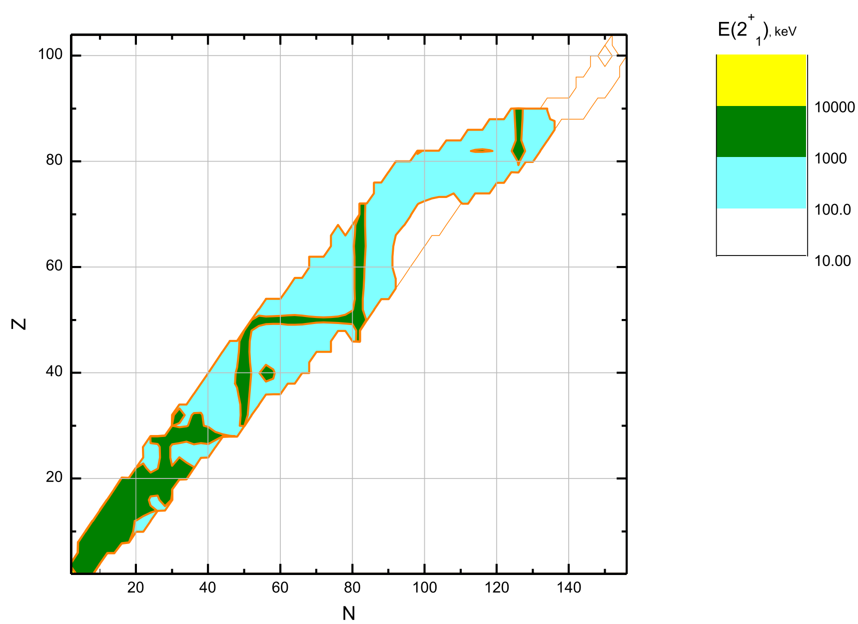

Fig. 3. Energies of 2^+_1 states (E(2^+_1)) for even–even $Z = 2$–104 nuclei, in keV.

5. Adopted values

The recommended values for $Z = 2$–104 isotopes from this work are shown in Table 3. These data extend the previous work of S. Raman et al. [13] with 119 new B(E2)↑ values as well as a large number of updated values. The current work also contains 646 γ-ray energies for the first 2^+ states in even–even nuclei. A comparative analysis of the two evaluations is presented below.

In the present evaluation, we used the latest version of the visual averaging library [22], Band–Raman calculation of Internal conversion coefficients (α_T) [24] and presently available data. The visual averaging library program includes unweighted and weighted averages as well as the limitation of relative statistical weights (LWM) [25], normalized residual (NRM) [26], Rajeval technique (RT) [27], the Expected Value (EVM) [28], bootstrap and Mandel–Paule (MP) [29] statistical methods to calculate averages of experimental data with uncertainties. In our evaluation, we generally adopted the weighted average, using NRM in some discrepant cases. We accepted reduced $\chi^2 < 2$ as a reasonable fit for available datasets. Previously, S. Raman et al. [13] used an averaging procedure based on the inverse of the quoted uncertainties, while current evaluation uses statistical methods based on the inverse squared value of the quoted uncertainties. Our procedure, in addition to being mathematically justifiable, is consistent with the general methodology used in treatment of data for ENSDF database and horizontal evaluations.

The Band–Raman method [24] was used in this work, while the previous evaluation [13] employed the internal conversion coefficients code (ICCDF) [30]. The former code incorporates the Dirac–Fock atomic model with the exchange interaction between atomic electrons and the free electron receding to infinity during the conversion process. Total conversion coefficients for the $Z = 2$–104—region were calculated using the Australian National University BrIcc code http://bricc.anu.edu.au/ and shown in Fig. 2. The

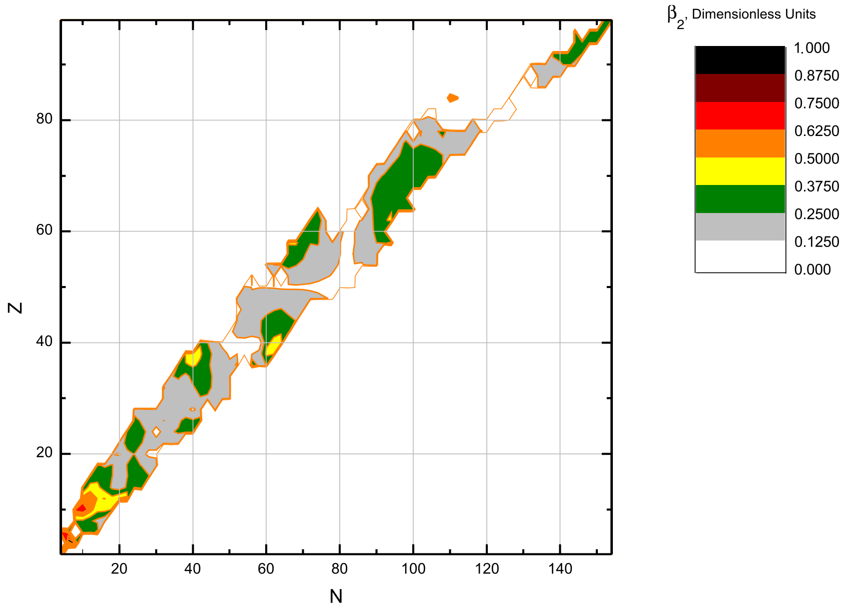

Fig. 4. Quadrupole deformation parameter (β_2) values for even–even $Z = 2$–104 nuclei.

coefficient values increase over eight orders of magnitude across the nuclear chart, and reach maximum values in the actinide region.

For low Z values and relatively high $2^+_1 \to 0^+_1$ transition energies, the total E2 conversion coefficients are relatively small ($\alpha_T < 0.002$) and do not substantially affect the adopted values. A complementary comparison between the present model-independent and the previous evaluation adopted values for ^{14}C, ^{28,34,36,38}Si, ^{38,40,42}S and ^{38}Ca, where no new data were added, shows good agreement. Consequently, the differences between the current work and S. Raman et al. [13] evaluation for light and medium nuclei are mainly due to the addition of new experimental results.

We recommend using model-independent or traditional B(E2)↑ adopted values as the most reliable. If a model-independent value is not available, a low model-dependent value should be used. Finally, a model-dependent value can be used if no other values are available. Table 3 recommended values for Coulomb excitation and in-elastic scattering measurements in ^{28}Ne and ^{30,32,34}Mg isotopes support this conclusion. This is consistent with the previous evaluation of Raman et al. [13], who treated data as follows: "However, our adopted B(E2)↑ values are based only on the traditional types of measurements because these are more direct and involve essentially model-independent analyses". Our new recommended values are interpreted within the scope of large-scale shell-model calculations which are presented in the following sections.

5.1. *Analysis of adopted values*

Evaluated values are traditionally given in a tabular format as in Table 3. In addition, we will also show these data in the two-, and three-dimensional graphic form and conduct a brief "visual inspection". Plots of evaluated 2^+_1 state energies, quadrupole deformation parameters, and quadrupole collectivities in e^{2}b^2 and W.u. units as functions of N and Z are shown in Figs. 3, 4 and 5, respectively. Fig. 3 shows that energies of the 2^+_1 states are relatively high near the closed shells at $Z = 20$, $Z = 28$ and $N = 28, Z = 50$ and $N = 50, Z = 82$ and $N = 82$, and $N = 126$. However, $2^+_1 \to 0^+_1$ transition energies are not sufficient for the understanding of nuclear structure effects across the nuclear chart.

Furthermore, a combination of the transition energy and quadrupole deformation plots supplies a more compelling picture of nuclear shell closure of atomic nuclei. The deformation parameter chart indicates an anti-correlation effect between its values and the 2^+_1 state energies, as shown in Figs. 4 and 3, respectively. The nuclear shell closure effects result in small deformation parameter values and relatively large first excited state energies. These effects near $Z = N = 8$, $Z = 20$, $Z = 40$ and $N = 50$, $Z = 50$ and $N = 82$, and $Z = 82$, and the deformation regions are shown in Fig. 4 using a vertical-line pattern. To gain additional insights on nuclear collectivity a complementary analysis of the B(E2)↑ adopted values has been conducted in Fig. 5. The last Figure clearly demonstrates distinct nuclear properties for light ($Z < 30$), medium ($Z < 50$), heavy ($Z < 84$), and actinide ($Z > 88$) nuclides. In addition, systematic trends of evaluated B(E2)↑ and $E_{2^+_1}$ values are shown in Graphs 1–52. These Graphs demonstrate the evolution of nuclear properties of even–even nuclei and could motivate new measurements.

6. Shell model calculations

The experimental data presented in this paper covers regions of the nuclear chart that are best treated by a diversity of nuclear structure models, including *ab initio* models such as Green's Function Monte Carlo (GFMC) [31], No-Core Shell Model (NCSM) [32], and Coupled-Cluster model [33], but also effective models such as the traditional shell model with effective interactions, Quasi-Particle Random Phase Approximation [34], Generator-Coordinate Method [35], etc. Attempting to describe the data using all these models is clearly a tall goal. Therefore, we confine ourselves to the description of a limited amount of data using the traditional shell model with effective interactions. This model seems to have a wide range of applicability, from light *p*-shell nuclei to nuclei around ^{208}Pb, provided that good effective interactions are available. Here, we only use the shell model to give some examples for *p*-shell nuclei, *sd*-shell nuclei, *sdpf*-shell nuclei, and *pf*-shell nuclei, for which effective shell model interactions are established. In that vein, we avoided cases where protons or neutrons are near closed shells or in the "island of inversion".

For the *p*-shell examples we used the CKIHE interaction [36] for ^{6}He and PWT interaction [37] for Be and C. For the *sd*-shell nuclei we used the USDB interaction [38] and for cases with protons in *sd*-shell and neutrons in the *pf*-shell we used the SDPFU interaction [39]. Finally, for the few cases of *pf*-shell nuclei we used the

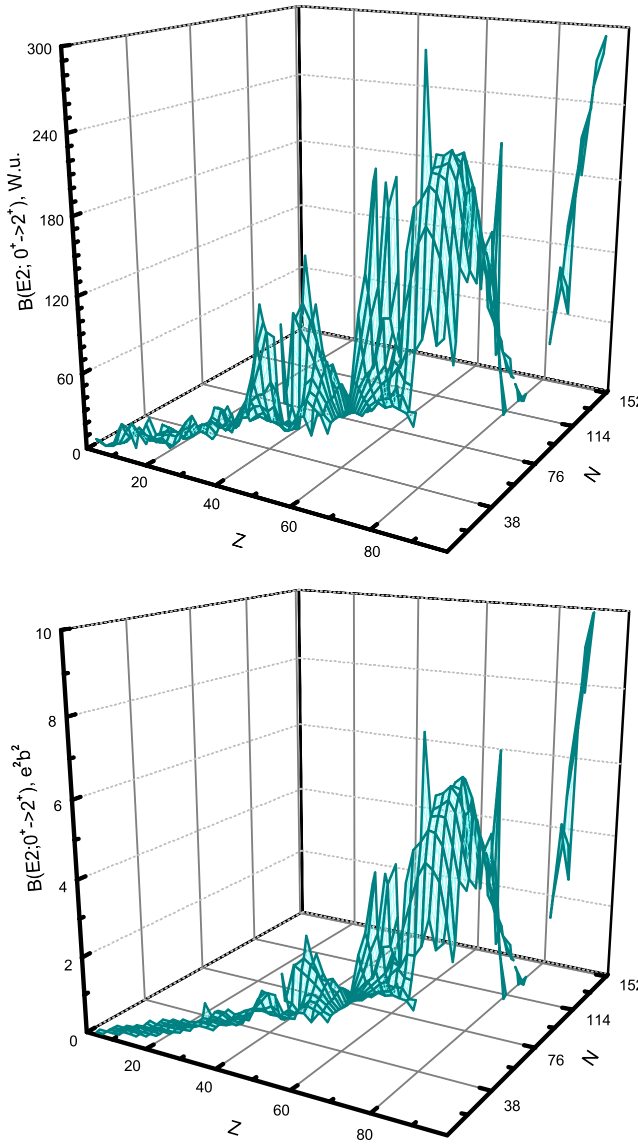

Fig. 5. B(E2)↑ in e^2b^2 and W.u. for even–even $Z = 2$–104 nuclei.

GXPF1A interaction [40,41]. A few other cases for the $A = 60$–100 region could be also considered using the JUN45 interaction [42] in a model space that includes the $1p_{3/2}$, $1p_{1/2}$, $0f_{5/2}$, $0g_{9/2}$ orbitals, but more insight into this region of nuclei is required for higher reliability. Isolated cases of Sn, Te, Xe, and Ba isotopes could be considered, but the effective interactions need to be further refined to show consistent reliability. Results of these calculations are shown in Table 4, and complementary details of shell model calculations and analysis of Cr, Fe, Ni and Zn nuclei could be found in our previous publication [14]. These results were produced with "canonical" effective charges: 0.5e for neutrons and 1.5e for protons.

Finally, the shell model and evaluated 2_1^+ state energies and quadrupole collectivities, are plotted in Graphs 1–52 for $Z = 2$, 8, 20, and 28, respectively. These values and their mutual correlations provide strong evidence for nuclear shell model across the nuclear chart. The strong correlations between transition energies and quadrupole collectivities are, particularly, evident for doubly-magic nuclei ^{40,48}Ca, ^{56}Ni, ^{132}Sn, and ^{208}Pb. In addition, analysis of Graph 1 data indicates "magic" properties for neutron-rich nucleus ^{24}O. There are other theoretical calculations of the B(E2)↑ values and first excited states in even–even nuclei [44,45]. These calculations could be used for nuclei where present shell model calculations are missing.

7. Future plans and complementary analyses

There is a large volume of B(E2) experimental activities worldwide; a new nucleus has been measured every month in the last 10–15 years. In such an active field of experimental work, constant compilation and evaluation work is required. A compilation of the latest experimental results will be posted on the B(E2) project website (http://www.nndc.bnl.gov/be2), and the next evaluation published in about ten years.

Due to space limitation, Grodzins systematics [46] and comparison of evaluated values based on the different types of measurements [47] are not presented here. These analyses will be addressed in subsequent publications.

8. Conclusions

A new B(E2;$0_1^+ \rightarrow 2_1^+$) compilation and evaluation of even–even nuclei has been performed under the auspices of the USNDP. It is a continuation of the nuclear data work by P.H. Stelson and L. Grodzins, and S. Raman et al. on quadrupole transition probabilities [11–13]. The current evaluation literature cut-off date is September 2015, it includes experimental B(E2)↑ values for 119 new nuclei, a large number of updates and extends the previous evaluation to 447 nuclei. The evaluation incorporates many features requested by nuclear data users and broadens the list of compiled experimental quantities. The present evaluated results are compared with the previous evaluation, and large-scale shell model calculations, where available.

Note added in Proof: After the acceptance of our paper we came across a recent publication of J.M. Allmond et al., Phys. Rev. C 92, 041303 (2015) [48] on the determination of B(E2)↑ values for the first 2^+ states by measurement of Coulomb excitation cross sections for even-even $^{112-124}$Sn nuclei, using Sn beams at Oak Ridge National Laboratory. These results are consistently higher than those of Ref. [2011Ju01] who measured lifetimes of the first 2^+ states using Doppler-Shift attenuation and line-shape methods. Reason for this discrepancy is not clear, and further experiments for Sn isotopes are warranted.

Acknowledgments

The authors are grateful to Dr. M. Herman (BNL) for his constant support of this project, J. Choquette and B. Karamy (McMaster University) for the help with compilation work in early stages of this project. We acknowledge Profs. T. Glasmacher, V.G. Zelevinsky (MSU), T. Motobayashi (RIKEN), V. Denisov (KINR) and J. Totans and M. Blennau (BNL) for productive discussions, help with the references and careful reading of the manuscript and useful suggestions, respectively. Finally, we would like to thank many authors, who provided valuable insights on their data. These communications have helped to resolve many experimental discrepancies. This work was funded by the Office of Nuclear Physics, Office of Science of the US Department of Energy grant KB0301042, under Contract No. DE-AC02-98CH10886 with Brookhaven Science Associates, LLC. Work at McMaster University was also supported by DOE grant DE-FG02-98-ER41080. M.H. acknowledges U.S. NSF Grant No. PHY-1404442 and U.S. Department of Energy Grant No. DE-SC0008529.

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Explanation of Tables

Table 1.	**Experimental B(E2)↑-, τ- and β_2-values for $Z = 2$–104 nuclei.**	
	(Throughout this table, bracketed numbers refer to the uncertainties in the last digits of the quoted values.)	
	Nuclide	The even Z, even N nuclide studied
	B(E2)↑	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2
	τ	Mean lifetime of the state in ps
	β_2	Quadrupole deformation parameter or δ deformation length
	Target	Target nuclide
	Beam	Incident beam
	Energy	Incident beam energy
	Method	CE: Coulomb excitation CE*: Coulomb excitation with beam energy above the Coulomb barrier EE (e, e′): Inelastic electron scattering DC: Delayed Coincidence GG (γ, γ'): Resonance fluorescence IN-EL: Inelastic scattering of light and heavy ions PB: Pulsed beam RDM, RDDS, TRDM: Recoil distance method RSM: Recoil shadow method SCATT: Neutron scattering TDSA, DSAM: Doppler shift attenuation TCS: Time coincidences
	Reference	NSR database [16] keynumber
	Comments	ENSDF: ENSDF analysis Ex: excluded Gos: GOSIA code MD: model dependent NR: not in Raman Rad: Raman adjusted Su: superseded Un: uncertainty introduced by Raman
Table 2.	**Comparative analysis of the present and S. Raman et al. [13] results.**	
	Nuclide	The even Z, even N nuclide studied
	Inverse squared B(E2)↑	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2
	Inverse B(E2)↑	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2
	Raman's B(E2)↑ [13]	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2
	Comments on Raman's values [13]	Description
Table 3.	**Adopted (recommended) B(E2)↑-, τ- and β_2-values for $Z = 2$–104 nuclei.**	
	(Throughout this table, bracketed numbers refer to the uncertainties in the last digits of the quoted values.)	
	Nuclide	The even Z, even N nuclide studied
	E(level)	Energy of the first excited 2^+ state in keV either from a compilation or from current literature
	B(E2)↑	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2 Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in W.u. (Weisskopf units); the Weisskopf single-particle value is $B(E2)\uparrow_{(sp)} = 2.97 \times 10^{-5} A^{4/3} e^2b^2$ [13] **Comments**: Multiply B(E2)↑ by a factor of 0.2 to convert it to B(E2)↓, $(B(E2)\downarrow = \frac{(2J_i+1)}{(2J_f+1)} B(E2)\uparrow$, where $J_i = 0$ and $J_f = 2)$; use formula (3) to extract transition quadrupole moment values
	τ	Mean lifetime of the state in ps $\tau = 40.81 \times 10^{13} E^{-5} [B(E2)\uparrow/e^2b^2]^{-1}(1+\alpha)^{-1}$, where α- Band-Raman internal conversion coefficients
	β_2	Quadrupole deformation parameter $\beta_2 = (4\pi/3ZR_0^2)[B(E2)\uparrow/e^2]^{1/2}$, where $R_0^2 = (1.2 \times 10^{-13} A^{1/3}\ \mathrm{cm})^2$ $= 0.0144 A^{2/3}$ b
Table 4.	**Shell model E(2_1^+)-, B(E2↑)-values for even–even nuclei.**	
	Nuclide	The even Z, even N nuclide studied
	E(level)	Energy of the first excited 2^+ state in MeV
	B(E2)↑	Reduced electric quadrupole transition rate for the ground state to 2^+ state transition in units of e^2b^2
	Model Space	Description
	Effective Interaction	Description
	Comments	Description

Explanation of Graphs

Graph 1.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for He nuclei**	
	Theory	CKIHE [36]
	Evaluation	

(continued on next page)

Graph 2.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Be nuclei.**	
	Theory	PWT [37]
	Evaluation	
Graph 3.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for C nuclei.**	
	Theory	PWT [37], USDB [38]
	Evaluation	
Graph 4.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for O nuclei.**	
	Theory	USDB [38]
	Evaluation	
Graph 5.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ne nuclei.**	
	Theory	USDB [38]
	Evaluation	
Graph 6.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Mg nuclei.**	
	Theory	USDB [38]
	Evaluation	
Graph 7.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Si nuclei.**	
	Theory	SDPFU [39]
	Evaluation	
Graph 8.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for S nuclei.**	
	Theory	SDPFU [39]
	Evaluation	
Graph 9.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ar nuclei.**	
	Theory	
	Evaluation	
Graph 10.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ca nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 11.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ti nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 12.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Cr nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 13.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Fe nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 14.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ni nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 15.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Zn nuclei.**	
	Theory	GXPF1A [40,41]
	Evaluation	
Graph 16.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ge nuclei.**	
	Evaluation	
Graph 17.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Se nuclei.**	
	Evaluation	
Graph 18.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Kr nuclei.**	
	Evaluation	
Graph 19.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) v alues for Sr nuclei.**	
	Evaluation	
Graph 20.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) v alues for Zr nuclei.**	
	Evaluation	
Graph 21.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Mo nuclei.**	
	Evaluation	
Graph 22.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ru nuclei.**	
	Evaluation	
Graph 23.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Pd nuclei.**	
	Evaluation	
Graph 24.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Cd nuclei.**	
	Evaluation	
Graph 25.	**Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Sn nuclei.**	
	Evaluation	
Graph 26.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Te nuclei.**	
	Evaluation	
Graph 27.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Xe nuclei.**	
	Evaluation	
Graph 28.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ba nuclei.**	
	Evaluation	
Graph 29.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ce nuclei.**	
	Evaluation	
Graph 30.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Nd nuclei.**	
	Evaluation	
Graph 31.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) v alues for Sm nuclei.**	
	Evaluation	
Graph 32.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Gd nuclei.**	
	Evaluation	
Graph 33.	**Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Dy nuclei.**	
	Evaluation	

(*continued on next page*)

Table 1
Experimental B(E2)↑-, τ- and β_2-values in $Z = 2$–104 nuclei (* —above the Coulomb barrier experiments). Beam energy units are in MeV or (A)-MeV. NSR database keynumbers [16] are shown in the reference column.

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{6}He	0.00054(7)				^{6}He	^{209}Bi	22.5	CE?*	[2007Ko23]	MD
^{6}He				$\delta = 1.7(3)$	^{6}He	p	240A	IN-EL	[1999Au01]	Ex, NR
^{10}Be			0.205(5)(7)		^{7}Li	^{7}Li	8,10	TDSA	[2009Mc02]	
^{10}Be			0.189(20)		d	^{9}Be	1.7	TDSA	[1968Fi09]	
^{10}Be			0.190(30)		d	^{9}Be	2.8	TDSA	[1966Wa10]	
^{12}Be			2.5(7)(3)		^{12}Be	Au	42.9A	TDSA	[2009Im01]	
^{12}Be				0.67(5)	^{12}Be	p	53.8A	IN-EL	[2000Iw02]	NR
^{14}Be				$\delta = 1.18(13)$	^{14}Be	^{12}C	68A	IN-EL	[2007Su20]	
^{10}C			0.219(12)		^{10}B	p	95	TDSA	[2012Mc03]	
^{10}C			0.155(25)		p	^{10}B	2-9.5	TDSA	[1968Fi09]	
^{12}C			0.060(13)		p	^{11}B	1.781	TDSA	[1988Lu04]	
^{12}C			0.058(5)		^{12}C	Au	0.4,0.8,1.4A	TDSA	[1988Ku33]	
^{12}C			0.061(18)		α	^{27}Al, ^{28}Si	720	TDSA	[1980Li14]	
^{12}C			0.045(10)		n	^{27}Al	fast	TDSA	[1976Be64]	
^{12}C			0.10(6)		γ	^{12}C	<6.75	GG	[1971Fa14]	
^{12}C			0.065(9)		α	^{15}N	0.898,1.640	TDSA	[1970Co09]	
^{12}C	0.00397(33)				e	^{40}Ca	28-60	EE	[1970St10]	
^{12}C			0.055(7)		p	^{12}C	4.1, 4.125, 4.55	TDSA	[1968Ri16]	
^{12}C	0.00386(37)				e	^{12}C	100-200	EE	[1967Cr01]	
^{12}C			0.060(20)		n	^{10}B	<5.3	TDSA	[1967Ca02]	
^{12}C			$0.057(^{+23}_{-17})$		α	^{9}Be	3.2	TDSA	[1966Wa10]	
^{12}C	0.00406(41)				e	^{12}C	250	EE	[1964Cr11]	
^{12}C			0.050(6)		α	^{9}Be	2	TDSA	[1961De38,1956De22]	
^{12}C			0.066(13)		p	^{15}N	4.43	GG	[1958Ra14]	
^{12}C	0.0047(10)			0.40(8)	e	^{12}C	187	EE	[1956He83]	
^{14}C	0.00187(25)				e	^{14}C	101.2	EE	[1972CrZN]	
^{16}C			$11.4(^{+11}_{-19})$		^{17}N	^{9}Be	72A	RDM	[2012Pe16]	
^{16}C			18.3(14)(48)		^{16}C	^{9}Be	40A	RDM	[2008On02]	
^{16}C			11.7(20)		^{9}Be	^{9}Be	40	RDM	[2008Wi04]	
^{16}C			77(14)(19)		^{16}C	^{9}Be	34.6A	RDM	[2004Im01]	Su
^{18}C			$22.4(^{+34}_{-24})$		^{19}Ne	^{9}Be	72A	RDM	[2012Vo05]	
^{18}C			18.9(9)(44)		^{18}C	^{9}Be	79A	RDM	[2008On02]	
^{20}C			$9.8(^{+28}_{-30})$		^{22}O	^{9}Be	101A	RDM	[2011Pe21]	
^{16}O	0.00372(40)				γ	^{16}O	6.92	GG	[1977La15]	
^{16}O	0.00392(16)				e	^{16}O	38-60	EE	[1975Mi08]	
^{16}O	0.00512(36)				e	^{16}O	100-126	EE	[1973Be49]	
^{16}O	0.00432(20)				γ	^{16}O	6.92	GG	[1970Sw03]	
^{16}O			$0.0064(^{+19}_{-16})$		p	^{19}F	0.874	TDSA	[1970Co09]	
^{16}O	0.00368(42)				e	^{16}O	Low momentum transfer	EE	[1968St04]	
^{16}O	0.00317(27)				γ	^{16}O	6.8-7.3	GG	[1968Ev03]	
^{16}O	0.0028(8)				γ	^{16}O	7	GG	[1960Re05]	
^{16}O	0.0023(6)				γ	^{16}O	6.91,7.12	GG	[1957Sw17]	
^{18}O					^{18}O	^{197}Au	46A	CE*	[2000Ri15]	
^{18}O			2.80(7)		^{18}O	^{4}He, ^{1}H	34, 47	TDSA	[1982Ba06]	
^{18}O	0.00448(13)				e	^{18}O	90-370	EE	[1982No04]	
^{18}O	0.00390(18)				^{18}O	^{208}Pb	57-86	CE	[1979Fe06]	
^{18}O	0.00410(14)				^{18}O	^{196}Pt, ^{208}Pb	58-75	CE	[1977Vo07]	
^{18}O			3.10(20)		^{16}O	^{3}H	10	TDSA	[1977LiZS]	
^{18}O	0.00453(26)				^{18}O	Au	60	CE	[1977Fl10]	
^{18}O			2.90(12)		^{18}O	p	47.3	RDM	[1976As07]	
^{18}O			2.99(12)		^{18}O	p	47.3	RDM	[1976As04]	Su
^{18}O	0.0048(2)				^{18}O	^{209}Bi	58-63	CE	[1975Kl09]	
^{18}O			2.79(11)		^{16}O	^{3}H	20	TDSA	[1975He25]	
^{18}O			3.35(20)		^{16}O	^{3}H	25	RDM	[1974Mc17]	
^{18}O			3.58(18)		α	^{18}O	6.0,8.5	RDM	[1974Be25]	
^{18}O			$2.9(^{+9}_{-6})$		t	^{19}F	2.6	TDSA	[1973Ol02]	
^{18}O	0.00390(40)				^{18}O	^{208}Pb	65	CE	[1971HaXH]	
^{18}O			3.25(20)					TDSA	[1968LaZZ]	
^{18}O	0.0046(14)				^{18}O	^{27}Al	21	CE*	[1968An20]	
^{18}O	0.0049(11)				^{18}O	^{116}Sn, ^{208}Pb	23-55	CE	[1967DeZW]	
^{18}O			$6.1(^{+50}_{-20})$		^{12}C	^{7}Li	11	TDSA	[1964Es02]	
^{18}O			3.7(7)		^{16}O	^{3}H	11-16	TDSA	[1963Li07]	
^{18}O	0.0051(23)				^{18}O	e	150	EE	[1961La09]	
^{20}O			10.3(8)		^{18}O	^{3}H	24.5	RDM	[1980Ru01]	
^{20}O			9.8(7)		^{18}O	^{3}H	20	TDSA	[1977He12]	
^{20}O			14.2(8)		^{18}O	^{3}H	30	RDM	[1975Be15]	
^{22}O				0.24(7)	^{22}O	^{2}H	34A	IN-EL	[2006El05]	
^{22}O				0.26(4)	^{22}O	p	46.6	IN-EL	[2006Be04]	
^{22}O	0.0021(8)				^{22}O	^{197}Au	50.6A	CE*	[2000Th11]	
^{24}O				0.15(4)	^{24}O	p	62A	IN-EL	[2012Ts03]	
^{18}Ne	0.0180(26)				^{18}Ne	Pb	50A	CE*	[2006YaZV]	
^{18}Ne			$0.77(^{+9}_{-7})$		^{16}O	^{3}He	38	TDSA	[2003Ri08]	
^{18}Ne	0.0125(22)				^{18}Ne	^{197}Au	60A	CE*	[2000Ri15]	
^{18}Ne			0.67(6)		^{16}O	^{3}He	38	TDSA	[1976Mc02]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{18}Ne			0.63(13)		^{16}O	^{3}H	25	TDSA	[1974Mc17]	
^{18}Ne			$0.49(^{+17}_{-9})$		^{3}He	^{16}O	8.5-13.15	TDSA	[1969Ro08]	
^{20}Ne			1.14(24)		^{12}C	^{12}C	32.6,33.5	TDSA	[1982Sp02]	
^{20}Ne	0.0322 (26) (22)				^{32}S	^{20}Ne	41.3-51	CE*	[1977Sc36]	
^{20}Ne	0.037(3)				^{20}Ne	Au	4.15A	CE	[1974Ol01]	NR
^{20}Ne									[1973ScWZ]	Su
^{20}Ne									[1969ScZV]	Su
^{20}Ne			0.8(2)		^{12}C	^{12}C	36.7	RDM	[1975Ho15]	
^{20}Ne	0.0280(40)				e	^{20}Ne	102	EE	[1973Si31]	
^{20}Ne			1.15(20)		^{12}C	^{12}C	20-30	TDSA	[1971Ha26]	
^{20}Ne	0.048(7)				^{20}Ne	^{120}Sn, ^{130}Te, ^{148}Sm	50-75	CE	[1970Na07]	
^{20}Ne			0.84(20)		α	^{16}O	2.9-3.2	TDSA	[1969Gr03]	
^{20}Ne			1.25(35)		^{3}He	^{19}F	8-10	TDSA	[1969An08]	
^{20}Ne			1.27(24)		Li	O	5.1-6.3	TDSA	[1969Th01]	
^{20}Ne			1.23(12)		^{12}C	^{12}C	12.8-16.6	TDSA	[1965Ev03]	
^{20}Ne			0.64(20)		^{12}C	^{12}C	17-18	TDSA	[1961Cl06]	Su
^{20}Ne	0.047(9)				^{14}N	^{20}Ne	21.3, 27.9	CE*	[1960An07]	
^{20}Ne								CE*	[1960Le07]	Su
^{20}Ne	0.041(10)				^{20}Ne	Be,B, C,Mg, Al,Si, MgO, ScO	23.5	CE*	[1959Al91]	NR
^{20}Ne			0.76(33)		p	^{23}Na	1.22	TDSA	[1956De22]	
^{22}Ne	0.0243(26), 0.0220(16)				^{22}Ne	Ni, ^{107}Ag	2.25A, 2.86A	CE	[2005NiZS]	
^{22}Ne			5.16(13)		α	^{19}F	6.3-7.3	RDM	[1984Bh03]	
^{22}Ne			5.1(2)		^{18}O	^{7}Li	10-60	RDM	[1983Ko01]	
^{22}Ne			5.15(31)		^{19}F	^{4}He	23.25,28.5	TDSA	[1979Fo02]	
^{22}Ne	0.0271(36)				e	^{22}Ne	60-110	EE	[1979Ma13]	
^{22}Ne			5.2(3)		^{19}F	^{4}He	38.5	RDM	[1977Ho01]	
^{22}Ne	0.0223(6)				^{32}S	^{22}Ne	41.3-51	CE*	[1977Sc36]	
^{22}Ne									[1973ScWZ]	Su
^{22}Ne									[1969ScZV]	Su
^{22}Ne			5.62(20)		α	^{19}F	5.65	RDM	[1977Ra01]	
^{22}Ne			5.0(7)		α	^{19}F	6.48	RDM	[1977Og03]	
^{22}Ne	0.025(2)				^{22}Ne	Au	4.15A	CE	[1974Ol01]	NR
^{22}Ne	0.0220(20)				e	^{22}Ne	102	EE	[1973Si31]	
^{22}Ne			5.4(4)		α	^{19}F	5.5,8.6	RDM	[1973An01]	
^{22}Ne			5.9(6)		α	^{19}F	2.9,4	RDM	[1972Sz05]	
^{22}Ne			5.9(11)		α	^{19}F	6.4	RDM	[1972Sn01]	
^{22}Ne	0.033(6)				^{22}Ne	^{120}Sn, ^{130}Te, ^{148}Sm	50-75	CE	[1970Na07]	
^{22}Ne			4.6(5)		α	^{19}F	5.5	RDM	[1969Jo10]	
^{22}Ne			6(4)		^{18}O	^{9}Be	15	RDM	[1969Ni09]	
^{22}Ne			8(3)		α	^{19}F	5.2	TDSA	[1966Li07]	
^{22}Ne			$6.1(^{+46}_{-26})$		^{16}O	^{7}Li	14.3	TDSA	[1964Es02]	
^{22}Ne	0.039(8)				N	^{22}Ne	16.3	CE*	[1960An07]	
^{22}Ne								CE*	[1960Le07]	Su
^{22}Ne	0.025(6)				^{22}Ne	Be,B, C,Mg, Al,Si, MgO, ScO	25.8	CE*	[1959Al91]	NR
^{24}Ne			$0.89(^{+36}_{-29})$		t	^{22}Ne	2.8	TDSA	[1974Wa04]	
^{24}Ne			$1.0(^{+2}_{-4})$		^{22}Ne	^{3}H	30	TDSA	[1969Bh01]	
^{26}Ne	0.0141(18)				^{26}Ne	Pb	54A	CE?*	[2007Gi06]	MD
^{26}Ne	0.0228(41)				^{26}Ne	^{197}Au	41.7A	CE*	[1999Pr09]	
^{28}Ne				0.39(2)	^{28}Ne	H	53.5A	IN-EL	[2014Mi09]	
^{28}Ne	0.0132(23)				^{28}Ne	Pb	46A	CE*	[2005Iw02]	
^{28}Ne	0.0269(136)				^{28}Ne	^{197}Au	53A	CE*	[1999Pr09]	
^{30}Ne				0.45(4)	^{30}Ne	H	44A	IN-EL	[2014Mi09]	
^{30}Ne				$0.58(^{+16}_{-22})$	^{30}Ne	p	48A	IN-EL	[2003Ya05]	
^{20}Mg	0.0177(32)			0.44(4)	^{20}Mg	Pb	58A	IN-EL	[2008Iw04]	
^{22}Mg			4.2(15)		^{3}He	^{20}Ne	10	TDSA	[1975Gr04]	
^{22}Mg			$1.0(^{+22}_{-5})$		^{3}He	^{20}Ne	4.3-11.5	TDSA	[1972Ro20]	
^{24}Mg	0.0467(28)				^{24}Mg	^{197}Au	54.5A	CE*	[2001Co20]	
^{24}Mg			1.97(16)		p	^{23}Na	0.7,1.7	TDSA	[1989Ke04]	
^{24}Mg			1.76(21)		γ	^{24}Mg	0.5-1.65	GG	[1981Ca10]	
^{24}Mg	0.0445(24)				^{24}Mg	^{208}Pb	80-110	CE	[1979Fe05]	
^{24}Mg			1.92(10)		^{28}Si, ^{29}Si, ^{31}P, ^{32,33,34}S, ^{35,37}Cl	^{24}Mg	39.5-42	TDSA	[1977Sc36]	
^{24}Mg									[1973ScWZ]	Su
^{24}Mg	0.0420(14)				^{28}Si, ^{29}Si, ^{31}P, ^{32,33,34}S, ^{35,37}Cl	^{24}Mg	39.5-42	CE*	[1977Sc36]	
^{24}Mg	0.048(5)				γ	^{24}Mg		GG	[1977Ca14]	
^{24}Mg			2.09(13)		^{16}O	^{12}C	41.7	RDM	[1975Ho15]	
^{24}Mg	0.044(3)				^{24}Mg	^{197}Au,Pt	102.6	CE	[1975Bi03]	
^{24}Mg			1.82(14)		^{24}Mg	^{4}He	40	TDSA	[1974Fo13]	
^{24}Mg	0.0420(25)				e	^{24}Mg	65-116	EE	[1974Jo10]	
^{24}Mg			2.25(9)		α	^{24}Mg	6.18	RDM	[1973Br33]	
^{24}Mg			2.00(45)		^{23}Na	p	0.6-1.5	TDSA	[1973Le15]	NR
^{24}Mg	0.0327(35)				e	^{24}Mg	183	EE	[1972Na06]	
^{24}Mg	0.0440(30)				^{24}Mg	^{208}Pb	90	CE	[1972HaYA]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{24}Mg			1.8(6)		p, α	^{24}Mg	22,42-50	TDSA	[1972Ba93]	
^{24}Mg			1.4(4)		p	^{23}Na	0.3-1.9	TDSA	[1972Me09]	
^{24}Mg			1.92(15)		γ	^{24}Mg	<1.6	GG	[1971Sw07]	
^{24}Mg	0.042(2)				^{16}O	^{24}Mg	20-22	CE*	[1971Vi01]	
^{24}Mg			2.07(34)		^{16}O	^{12}C	25	TDSA	[1970Cu02]	
^{24}Mg	0.0412(43)				e	^{24}Mg	25	EE	[1970Kh05]	
^{24}Mg			2.11(16)		^{12}C	^{16}O	17	RDM	[1970Al10]	
^{24}Mg			1.11(13)		γ	^{24}Mg	1.37	GG	[1970He01]	
^{24}Mg	0.0425(29)				^{35}Cl	^{24}Mg	62	CE*	[1970Ha04]	
^{24}Mg			$1.7(^{+10}_{-5})$		^{3}He	^{23}Na	8-10	TDSA	[1969An08]	
^{24}Mg	0.036(7), 0.047(6)				e	^{24}Mg	100-250	EE	[1969Sa14]	
^{24}Mg			1.65(15)		^{35}Cl	^{24}Mg	52-61	TDSA	[1969Pe11]	
^{24}Mg	0.0455(12)				e	^{24}Mg	54	EE	[1969Ti01]	
^{24}Mg			$1.44(^{+11}_{-9})$		α	^{24}Mg	22	TDSA	[1968Ro05]	
^{24}Mg			1.60(20)		^{16}O	^{12}C	26	TDSA	[1968Cu05]	
^{24}Mg	0.044(6)				γ	^{24}Mg	0.1368	GG	[1966Sk01]	
^{24}Mg	0.080(15)				γ	^{24}Mg	1.37	GG	[1965Ka15]	
^{24}Mg			1.3(4)		γ	^{24}Mg	1.37	GG	[1964Bo22]	
^{24}Mg			2.2(8)		γ	^{24}Mg	1.37	GG	[1962Bo17]	
^{24}Mg	0.062(23)				γ	^{24}Mg	1.37	GG	[1960Me06]	
^{24}Mg	0.034(7)				^{16}O	^{24}Mg	19	CE*	[1960Go08]	
^{24}Mg	0.065(13)				^{14}N	^{24}Mg	16.3	CE*	[1960An07]	
^{24}Mg			1.1(4)		γ	^{24}Mg	1.37	GG	[1959Of14]	
^{24}Mg			0.95(86)		γ	^{24}Mg	1.37	GG	[1959Ar56]	
^{24}Mg	0.054(14)				N,O	C	15.9, 18.1	CE*	[1958Al22]	NR
^{24}Mg	0.053(12)				γ	^{24}Mg	1.37	GG	[1958De33]	
^{24}Mg			1.90(17)		e	^{24}Mg	187	EE	[1956He83]	
^{26}Mg	0.0315(28)				^{26}Mg	^{209}Bi	78.6A	CE*	[2005Ch66]	
^{26}Mg	0.0322(16)				^{26}Mg	^{208}Pb	80-120	CE	[1982Sp05]	
^{26}Mg			0.653(39)		^{23}Na	^{4}He	43.3	TDSA	[1981Dy01]	
^{26}Mg	0.0296(13)				^{28,29}Si, ^{31}P, ^{32,33,34}S, ^{35,37}Cl	^{26}Mg	39.5-42	CE*	[1977Sc36]	
^{26}Mg									[1973ScWZ]	Su
^{26}Mg			0.69(5)		^{28,29}Si, ^{31}P, ^{32,33,34}S, ^{35,37}Cl	^{26}Mg	39.5-42	TDSA	[1977Sc36]	
^{26}Mg			0.705(110)		α	^{26}Mg	16	TDSA	[1975Wa10]	
^{26}Mg			0.72(3)		α	^{26}Mg		TDSA	[1975Eb01]	
^{26}Mg	0.0275(20)				e	^{26}Mg	57-111	EE	[1974Le17]	
^{26}Mg	0.0299(29)				e	^{26}Mg		EE	[1973Le17]	
^{26}Mg			0.61(10)		α	^{23}Na	4.6-7.5	TDSA	[1972Du05]	
^{26}Mg			0.70(30)		^{19}F	^{12}C	25	RDM	[1971Mc20]	
^{26}Mg	0.0349(30)				e	^{26}Mg	25	EE	[1970Kh05]	
^{26}Mg			$0.30(^{+10}_{-6})$		p	^{26}Mg	2.8-5.5	TDSA	[1970De01]	
^{26}Mg			0.53(10)		p	^{26}Mg	3.8-8.3	TDSA	[1968Ha18]	
^{26}Mg			$0.570(^{+39}_{-36})$		α	^{26}Mg	22	TDSA	[1968Ro05]	
^{26}Mg			0.70(30)		γ	^{26}Mg	1.8	GG	[1964Bo22]	
^{26}Mg	0.035(9)				^{14}N, ^{20}Ne	^{26}Mg	18, 25.8	CE	[1961An07]	
^{26}Mg			0.7(3)		γ	^{26}Mg	1.8	GG	[1961Ra05]	
^{28}Mg	0.0444(66)				^{28}Mg	Pb	53A	CE*	[2012To06]	
^{28}Mg			2.0(4)		t	^{26}Mg	2.54-3.20	TDSA	[1974Ra15]	
^{28}Mg			1.6(2)		t	^{26}Mg	2.9	TDSA	[1973Fi03]	
^{30}Mg	0.0241(31)				^{30}Mg	Ni	2.25A	CE*	[2005Ni11]	
^{30}Mg	0.0435(58)				^{30}Mg	^{12}C, ^{208}Pb	32A	IN-EL	[2001Ch56]	
^{30}Mg	0.0295(26)				^{30}Mg	^{197}Au	50A	CE*	[1999Pr09]	
^{32}Mg	0.0432(51)				^{32}Mg	Pb	195A	CE*	[2015Li28]	
^{32}Mg				0.51(6)	^{32}Mg	H	58.9A	IN-EL	[2014Mi09]	
^{32}Mg				0.41(3)	^{32}Mg	p	190A	IN-EL	[2012Li45]	
^{32}Mg	0.0434(52)				^{32}Mg	^{107}Ag	2.84A	CE*	[2005NiZS]	
^{32}Mg			23.1(58)			^{32}Mg(β^-)		TCS	[2005Ma81]	
^{32}Mg	0.0447(57)				^{32}Mg	^{197}Au	81.1A	CE*	[2005Ch66]	
^{32}Mg	0.0622(90)				^{32}Mg	^{208}Pb	32A	IN-EL	[2001Ch56]	
^{32}Mg	0.0449(3)				^{32}Mg	^{208}Pb	44A*	CE*	[2001Iw07]	Ex
^{32}Mg	0.0440(55)				^{32}Mg	^{197}Au	50A	CE*	[1999Pr09]	
^{32}Mg	0.0333(70)				^{32}Mg	^{197}Au	50A	CE*	[1999Pr09]	Ex
^{32}Mg	0.0454(78)				^{32}Mg	^{208}Pb	49.2A	CE*	[1995Mo16]	NR
^{34}Mg				0.62(6)	^{34}Mg	H	51.1A	IN-EL	[2014Mi09]	
^{34}Mg				0.68(16)	^{34}Mg	p	50A	IN-EL	[2006El03]	
^{34}Mg	0.0541(102)				^{34}Mg	^{209}Bi	76.4A	CE*	[2005Ch66]	
^{34}Mg	0.0631(126)				^{34}Mg	Pb	44.9A	CE*	[2001Iw07]	
^{34}Mg	<0.0670				^{34}Mg	^{197}Au	50A	CE*	[1999Pr09]	
^{36}Mg				0.50(6)	^{36}Mg	H	44.5A	IN-EL	[2014Mi09]	
^{24}Si	0.00955(295)				^{24}Si	^{208}Pb	58.9A	CE*	[2002Ka80]	
^{26}Si	0.0336(36)				^{26}Si	^{197}Au	54.5A	CE*	[2001Co20]	
^{26}Si			0.62(6)		^{24}Mg	^{3}He	50	TDSA	[1982Al15]	
^{26}Si			$1.4(^{+7}_{-5})$		^{3}He	^{24}Mg	5.5,7.8,10	TDSA	[1969Be31]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{28}Si	0.0350(18)				^{28}Si	^{208}Pb	105	CE	[1980Ba40]	
^{28}Si	0.0326(20)				^{28}Si	^{208}Pb	94.88-104.86, 109.85-139.81	CE	[1980Sp09]	
^{28}Si			0.688(26)		^{28}Si	^{4}He	53	TDSA	[1980Sc25]	
^{28}Si			0.697(39)		^{28}Si	^{4}He	46.8, 28.0, 48.2	TDSA	[1979Po01]	
^{28}Si			0.667(35)		^{28}Si	^{4}He	55	TDSA	[1979Fo02]	
^{28}Si			0.733(50)		^{28}Si	^{24,25,26}Mg, ^{27}Al	39.5-42	TDSA	[1977Sc36]	
^{28}Si	0.0337(30)				e	^{28}Si	18.5-117.1	EE	[1977Br16]	
^{28}Si	0.0331(12)				^{28}Si	^{24,25,26}Mg, ^{27}Al	39.5-42	CE*	[1977Sc36]	
^{28}Si									[1973ScWZ]	Su
^{28}Si			0.83(17)		p	^{27}Al	3	TDSA	[1977MiZM]	
^{28}Si			0.70(8)		α	^{28}Si	7.5	TDSA	[1975Eb01]	
^{28}Si	0.0280(38)				e	^{28}Si	183, 250	EE	[1972Na06]	
^{28}Si	0.0330(28)				γ	^{28}Si		GG	[1972ArZD]	
^{28}Si	0.033(4)				^{28}Si	^{206}Pb	100-120	CE	[1970Na05]	
^{28}Si			0.59(13)		p	^{27}Al	1.317	TDSA	[1970Hu14]	
^{28}Si			0.78(15)		p	^{27}Al	0.7-2.0	TDSA	[1970Al05]	
^{28}Si			0.87(22)		α	^{24}Mg	2.9-3.2	TDSA	[1969Gr03]	
^{28}Si			0.73(5)		^{32}S	^{28}Si	60	TDSA	[1969Pe08]	
^{28}Si			$0.56(^{+40}_{-22})$		p	^{27}Al	1-3	TDSA	[1969Bi09]	
^{28}Si			$0.59(^{+60}_{-15})$		p	^{27}Al	0.29-1.01	TDSA	[1969Me14]	
^{28}Si			0.86(11)		^{3}He	^{27}Al	8-10	TDSA	[1969An08]	
^{28}Si	0.0317(17)				^{28}Si	^{62}Ni	70	CE*	[1969Ha31]	
^{28}Si			0.62(15)		γ	^{27}Al	1.8-3.6	GG	[1968Cr07]	
^{28}Si			0.706(+24 − 23)		α	^{28}Si	22	TDSA	[1968Ro05]	
^{28}Si			0.71(6)		p	^{28}Si	9-10	TDSA	[1968Ma05]	
^{28}Si			0.58(+10 − 9)		p	^{27}Al	1.2-2.4	TDSA	[1968Gi05]	
^{28}Si	0.040(8)				γ	^{28}Si	1-2	GG	[1967Be39]	
^{28}Si	0.034(7)				^{12}C	^{28}Si	36.8	CE*	[1967Af03]	
^{28}Si	0.0428(40)				e	^{28}Si	30-56	EE	[1966Li08]	
^{28}Si	0.0329(46)				γ	^{28}Si	1.772	GG	[1966Sk01]	
^{28}Si			0.56(15)		γ	^{28}Si	0.5-3	GG	[1964Bo22]	
^{28}Si			0.72(6)		γ	^{28}Si	1.8	GG	[1963Sk01]	
^{28}Si	0.029(10)				γ	^{28}Si	4	GG	[1962Bo17]	
^{28}Si	0.027(9)				^{16}O	^{28}Si		CE	[1960Ad01]	
^{28}Si	0.044(9)				^{20}Ne	^{28}Si	23-28	CE*	[1960An07]	
^{28}Si								CE	[1960Le07]	Su
^{28}Si	0.025(5)				^{16}O	^{28}Si	25	CE*	[1960Go08]	
^{28}Si			0.73(22)		γ	^{28}Si	1.8	GG	[1959Of14]	
^{28}Si			0.60(10)		e	^{28}Si		EE	[1956He83]	
^{30}Si			0.358(18)		^{28}Si	^{3}H	33	TDSA	[1980Sc25]	
^{30}Si			0.310(40)		α	^{27}Al	12,14.1,15	TDSA	[1980Bi14]	
^{30}Si	0.0257(34)				^{30}Si	^{208}Pb	106-136	CE	[1979Fe08]	
^{30}Si			0.27(14)		^{32}S	^{30}Si	41.3-51	TDSA	[1977Sc36]	
^{30}Si									[1973ScWZ]	Su
^{30}Si	0.029(7)				^{32}S	^{30}Si	41.3-51	CE*	[1977Sc36]	
^{30}Si	0.0216(30)				e	^{30}Si	18.5-117.1	EE	[1977Br16]	
^{30}Si			0.36(4)		α	^{30}Si	8.5	TDSA	[1975Eb01]	
^{30}Si			0.351(19)		^{28}Si	^{3}H	33	TDSA	[1975He25]	
^{30}Si			0.35(7)		α	^{27}Al	9-10	TDSA	[1972Ga05]	
^{30}Si			0.330(50)		α	^{27}Al	5.0,6.3,8.0	TDSA	[1971Sh11]	
^{30}Si			0.332(21)		α	^{27}Al	4.5-8.2	TDSA	[1970Cu02]	
^{30}Si			0.300(40)		p	^{30}Si	3.435	TDSA	[1969Bi11]	
^{30}Si			0.26(6)		α	^{27}Al	3.47-4.55	TDSA	[1967Li05]	
^{30}Si			0.46(5)		α	^{27}Al	4.1	TDSA	[1967Br01]	
^{32}Si	0.0113(33)				^{32}Si	^{197}Au	37.4-48.2A	CE*	[1998Ib01]	
^{32}Si			0.48(7)		t	^{30}Si	2.5-3.3	TDSA	[1974Gu11]	Ex
^{32}Si			0.92(32)		t	^{30}Si	2.7,2.8	TDSA	[1972Pr18]	
^{34}Si	0.0085(33)				^{34}Si	^{197}Au	37.4-48.2A	CE*	[1998Ib01]	
^{36}Si				0.25(4)	^{36}Si	p	0.4c	IN-EL	[2007Ca35]	
^{36}Si	0.0193(59)				^{36}Si	^{197}Au	37.4-48.2A	CE*	[1998Ib01]	
^{38}Si				0.36(3)	^{38}Si	p	0.4c	IN-EL	[2007Ca35]	
^{38}Si	0.0193(71)				^{38}Si	^{197}Au	37.4-48.2A	CE*	[1998Ib01]	
^{40}Si				0.37(5)	^{40}Si	p	0.4c	IN-EL	[2007Ca35]	
^{28}S	0.0181(31)				^{28}S	Pb	53A	CE*	[2012To06]	
^{30}S	0.0350(33)				^{30}S	^{197}Au	45.9A	CE*	[2002Co09]	
^{30}S			0.254(23)		^{28}Si	^{3}He-implanted Au	60	TDSA	[1982Al22]	
^{30}S			0.14(5)		^{3}He	^{28}Si	7.0-10.0	TDSA	[1973Ku15]	
^{30}S			0.31(8)		^{3}He	Si	6.5-10	TDSA	[1972Ca22]	
^{30}S			0.175(35)		t	^{28}Si	4-8	TDSA	[1970Bi08]	
^{32}S			0.258(8)		^{32}S	C	65	TDSA	[2006Sp01]	
^{32}S			0.212(35)		γ	^{32}S	9.9	GG	[2002Ba28]	
^{32}S			0.252(40)		^{31}P	p	0.21c	TDSA	[1998Ka31]	NR
^{32}S			0.236(16)		^{32}S	^{4}He implanted in Cu	70	TDSA	[1980Ba40]	
^{32}S			0.240(27)		^{32}S	Si	47-51	TDSA	[1977Sc36]	
^{32}S	0.0300(13)				^{32}S	Si	47-51	CE*	[1977Sc36]	
^{32}S			0.195(70)		p	^{31}P	0.811, 1.117	TDSA	[1974Ch09]	
^{32}S	0.0305(16)				^{32}S	^{204}Pb	100, 112.5, 125	CE	[1974Ol02]	

(*continued on next page*)

Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{32}S			0.18(8)		p	P	0.35-2.03	TDSA	[1972Co13]	
^{32}S	0.0284(20)				^{32}S	^{112}Cd	90, 100	CE	[1971Ha47]	
^{32}S			0.23(6)		α	^{32}S	14.39, 14.50	TDSA	[1971Ga01]	
^{32}S			0.175(30)		p	^{31}P	439, 541, 642	TDSA	[1971Re15]	
^{32}S			0.35(6)		p	P, S	9.275, 1.555	TDSA	[1971In02]	
^{32}S			0.23(5)		e	^{32}S	28-60	EE	[1970St10]	
^{32}S	0.033(5)				^{32}S	^{206}Pb	130-150	CE	[1970Na05]	
^{32}S			0.26(8)		p	^{31}P	0.811-1.555	TDSA	[1969Th03]	
^{32}S			0.30(8)		α	^{28}Si	2.9-3.2	TDSA	[1969Gr03]	
^{32}S	0.042(9)				^{12}C	S	36.8	CE*	[1967Af03]	
^{32}S			0.33(8)		γ	^{32}S	2.24	GG	[1964Ma01]	
^{32}S			0.27(9)		γ	^{32}S	0.5 to 3.0	GG	[1964Bo22]	
^{32}S	0.0200(22)				e	S	120-180	EE	[1964Lo08]	
^{32}S			0.26(9)		γ	S	3	GG	[1962Bo17]	
^{32}S			0.160(15)		e	^{32}S	187	EE	[1956He83]	
^{34}S	0.0193(7)				^{34}S	e	120, 240, 320	EE	[1985Wo06]	
^{34}S			0.442(26)		^{34}S	^{4}He implanted in Cu	70	TDSA	[1980Ba40]	
^{34}S			0.490(30)		^{32}S	^{2,3}H	38	TDSA	[1977He12]	NR
^{34}S			0.465(50)		^{34}S	Si	49-52.5	TDSA	[1977Sc36]	
^{34}S	0.0203(13)				^{34}S	Si	49-52.5	CE*	[1977Sc36]	
^{34}S	0.0250(40)				^{34}S	^{206}Pb	122	CE	[1974Ol02]	
^{34}S			0.400(40)		α	^{31}P	7.2-8.0	TDSA	[1974Gr06]	
^{34}S			0.47(9)		α	^{31}P	8.05, 8.14, 8.35	TDSA	[1970Cu02]	
^{34}S			0.46(10)		α	^{31}P	4.67	TDSA	[1970Br18]	
^{34}S			0.400(32)		α	^{31}P	5.0-7.3	TDSA	[1970Ra17]	
^{34}S			0.44(5)		α	^{31}P	5.0-7.3	TDSA	[1970Gr11]	
^{34}S			0.35(6)		α	^{31}P	4.5-6.1	TDSA	[1969Gr03]	
^{36}S			0.12(1)		^{36}S	^{12}C	70	TDSA	[2008Sp01]	
^{36}S			0.110(30)		t	^{34}S	3.1	TDSA	[1972Sa09]	
^{38}S				0.35(4)	^{38}S	p	39A	IN-EL	[1997Ke07]	NR
^{38}S	0.0235(30)				^{38}S	^{197}Au	39.2A	CE*	[1996Sc31]	
^{40}S				0.35(5)	^{40}S	p	30A	IN-EL	[1999Ma63]	NR
^{40}S	0.0334(36)				^{40}S	^{197}Au	39.5A	CE*	[1996Sc31]	
^{42}S	0.0397(63)				^{42}S	^{197}Au	40.6A	CE*	[1996Sc31]	
^{44}S	0.0314(88)				^{44}S	^{197}Au	35A	CE*	[1997Gl02]	
^{32}Ar	0.0266(68)				^{32}Ar	^{197}Au	50.9A	CE*	[2002Co09]	
^{34}Ar			0.46(6)		^{32}S	^{3}He-implanted Au	80	TDSA	[1985Al18]	
^{34}Ar			0.33(8)		^{3}He	^{32}S	8	TDSA	[1974Be18]	
^{34}Ar			0.20(6)		^{3}He	S	8-12	TDSA	[1974Gr19]	Ex
^{34}Ar			0.15(5)		^{3}He	Si	6.5-10	TDSA	[1972Ca22]	Ex
^{36}Ar			0.65(2)		^{32}S	C	65	TDSA	[2006Sp01]	
^{36}Ar	0.0310(31)				^{36}Ar	^{197}Au	56.1A	CE*	[1999Co23]	
^{36}Ar	0.0286(23)				^{36}Ar	^{197}Au	50A	CE*	[1999Pr09]	
^{36}Ar	0.0280(16)				e	^{36}Ar	65-115	EE	[1977Fi09]	
^{36}Ar			0.34(11)		p	^{35}Cl	0.4-3.0	TDSA	[1974Jo02]	
^{36}Ar			0.35(12)		p	^{35}Cl	0.8-2.3	TDSA	[1972Ho40]	
^{36}Ar	0.032(5)				^{36}Ar	^{206}Pb	150	CE	[1971Na06]	
^{36}Ar			0.40(10)		p	^{35}Cl	1.7-2.6	TDSA	[1970Th04]	
^{36}Ar			0.46(11)		α	S	3.189	TDSA	[1969Gr03]	
^{38}Ar			0.71(3)		^{34}S	C	67	TDSA	[2006Sp01]	
^{38}Ar			0.68(3)		^{35}Cl	^{4}He implanted in Ti, Fe, Ni, Cu, Ag, Au	55	TDSA	[1976Fo12]	
^{38}Ar			0.76(24)		α	^{37}Cl	6.25	TDSA	[1971Ja15]	
^{38}Ar			0.93(27)		α	^{35}Cl	8.00	TDSA	[1971Ja10]	
^{38}Ar			$0.47(^{+15}_{-11})$		α	Cl	8.10	TDSA	[1970Cu02]	
^{38}Ar			0.54(7)		α	Cl	7.61	TDSA	[1969En04]	
^{38}Ar			0.45(11)		α	Cl	6.1	TDSA	[1969Gr03]	
^{38}Ar			0.65(9)		α	Cl	5.9, 10.5	TDSA	[1968Li04]	
^{40}Ar			1.8(2)		^{36}S	C	70	TDSA	[2008Sp01,2008Sp04]	
^{40}Ar	0.037(7)				^{197}Au	^{40}Ar	38.4A	CE*	[1998Ib01]	
^{40}Ar			2.00(40)		α	^{37}Cl	11	TDSA	[1983Bi08]	
^{40}Ar			$1.04(^{+116}_{-4})$		p	^{40}Ar	5.75	TDSA	[1979Be41]	
^{40}Ar	0.0382(13)				e	^{38}Ar	65-115	EE	[1977Fi09]	
^{40}Ar			1.95(15)		p	^{40}Ar	6.75	TDSA	[1976So03]	
^{40}Ar			1.20(37)		α	^{37}Cl	6.25	TDSA	[1971Ja15]	
^{40}Ar			$2\,(^{+18}_{-1})$		α	Cl	8.4	TDSA	[1970Cu02]	Ex
^{40}Ar	0.032(5)				^{40}Ar	^{130}Te, ^{120}Sn, ^{206}Pb	110-125	CE	[1970Na05]	
^{40}Ar	0.049(10)				^{40}Ar	Al	48	CE*	[1965Gu10]	
^{42}Ar			$3.8(^{+10}_{-8})$		t	^{40}Ar	2.8	TDSA	[1974Fi01]	
^{44}Ar			5.9(20)		^{48}Ca	^{208}Pb	310	RDM	[2010Me07]	
^{44}Ar	$0.0378(^{+34}_{-55})$				^{44}Ar	^{109}Ag, ^{208}Pb	2.68A, 3.68A	CE*	[2009Zi01]	
^{44}Ar	0.0345(41)				^{44}Ar	^{197}Au	80A	CE*	[1996Sc31]	
^{46}Ar	$0.0271(^{+22}_{-26})$				^{46}Ar	Pb	60A	CE*	[2014Ca10]	
^{46}Ar			$0.8(^{+3}_{-4})$		^{48}Ca	^{208}Pb	310	RDM	[2010Me07]	Ex
^{46}Ar	0.0218(31)				^{46}Ar	^{197}Au	76.4A	CE*	[2003Ga20]	
^{46}Ar	0.0196(39)				^{46}Ar	^{197}Au	80A	CE*	[1996Sc31]	
^{48}Ar	0.0346(55)				^{48}Ar	^{9}Be	96A	CE*	[2012Wi05]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{38}Ca	0.0096(21)				^{38}Ca	^{197}Au	56.1A	CE*	[1999Co23]	
^{38}Ca			0.098($^{+43}_{-40}$)		^{36}Ar	^{3}He	9,10,10.5	TDSA	[1975HaYU]	NR
^{40}Ca			0.042(12)		γ	^{40}Ca	9.9	GG	[2002Ha13]	
^{40}Ca			0.052(20)		n	^{40}Ca	E=fast	TDSA	[1989Ge09]	Su, NR
^{40}Ca			0.052(20)		n	^{40}Ca	E=fast	TDSA	[1984El12]	
^{40}Ca	0.0090(10)				e	Ca	120	EE	[1973Ha13]	
^{40}Ca			0.040(16)		p	Ca	9.86, 10.81	TDSA	[1972Si01]	
^{40}Ca			0.048(10)		p	^{40}Ca	7.2	TDSA	[1971Ma03]	
^{40}Ca			0.058(10)		p	^{39}K	1.344	TDSA	[1971Ma03]	
^{40}Ca			0.054(14)					TDSA	[1970StZP]	
^{40}Ca	0.0112(24)				e	^{40}Ca	28-60	EE	[1970St10]	
^{40}Ca			0.045(5)					GG	[1970RaZC]	
^{40}Ca	0.00720(30)				e	^{40}Ca	183, 250	EE	[1970It01]	
^{40}Ca			0.07(5)		p	^{40}Ca	8.5, 9	TDSA	[1969Po04]	
^{40}Ca	0.0084(11)				e	^{40}Ca	20-60	EE	[1969Ei03]	
^{40}Ca			0.064(19)		p	^{40}Ca	8-10	TDSA	[1968Ma05]	
^{40}Ca			0.025(6)		p	^{39}K	1.1-2.5	TDSA	[1968Li12]	
^{40}Ca			0.019(6)		p	^{39}K	4	TDSA	[1968Do12]	
^{40}Ca	0.0029(9)				e	^{40}Ca	120, 150, 180 220	EE	[1963Bl04]	
^{42}Ca			1.52(10)		^{42}Ca	C	95	TDSA,CE	[2003Sc21]	
^{42}Ca	0.0418(15)				e	^{42}Ca	62.5-250	EE	[1989It02]	
^{42}Ca	0.0412(15)				^{32}S	^{42}Ca	60	CE*	[1973To07]	
^{42}Ca			0.75($^{+5}_{-4}$)		γ	^{42}Ca	1.524	GG	[1972KaXR]	
^{42}Ca	0.0320(20)				e	^{42}Ca	297.5	EE	[1971He08]	
^{42}Ca			0.90(30)		α	K	7.5	TDSA	[1971Ha12]	
^{42}Ca			1.60(30)		p	^{42}Ca	7.8	TDSA	[1969Ko03]	
^{42}Ca			0.75(30)		α	K	7.5, 9.0, 10.6	TDSA	[1969Ha02]	
^{42}Ca			1.00(30)					TDSA	[1969Ca24]	
^{42}Ca	0.037(8)				γ	^{42}Ca	1.52	GG	[1966Me11]	
^{44}Ca			4.4(4)		^{44}Ca	C	95	TDSA,CE	[2003Sc21]	
^{44}Ca	0.0550(20)				e	^{44}Ca	62.5-250	EE	[1989It02]	
^{44}Ca	0.0473(20)				^{32}S	^{44}Ca	55	CE*	[1973To07]	
^{44}Ca			5.1(10)		α	K	9	TDSA	[1973Mc16]	
^{44}Ca			4.60(38)		^{35}Cl	Ca	56-68	TDSA	[1973Fi15]	
^{44}Ca			2.9($^{+11}_{-7}$)		p	Ca	4.235	TDSA	[1972Gr04]	
^{44}Ca	0.0545(35)				α	^{44}Ca	4.5, 4.75, 5	CE	[1972Bi17]	
^{44}Ca	0.0480(30)				e	^{44}Ca	297.5	EE	[1971He08]	
^{44}Ca	0.035(7)				^{14}N, ^{20}Ne	^{44}Ca	16.8, 21.5, 26	CE	[1961An07]	
^{46}Ca			7.3(13)		^{48}Ca	^{64}Ni, ^{208}Pb	282,310	RDM	[2012Mo11]	
^{46}Ca			5.5(22)		^{48}Ca	^{208}Pb	310	RDM	[2009Me23]	
^{46}Ca			6.6(15)		^{46}Ca	^{12}C	95	TDSA,CE*	[2003Sp04]	
^{46}Ca	0.0182(13)				α	^{46}Ca	4.5, 4.75, 5	CE	[1972Bi17]	
^{48}Ca			0.051(6)		γ	^{48}Ca	5.5, 8, 9.9	GG	[2002Ha13]	
^{48}Ca			0.060($^{+11}_{-12}$)		n	^{48}Ca	4.8-8	TDSA	[1992Va06]	NR
^{48}Ca	0.0082(5)				e	^{48}Ca	240.1	EE	[1985Wi06]	NR
^{48}Ca			0.053(24)		p	^{48}Ca	7-9	TDSA	[1970Be39]	
^{48}Ca	0.0086(12)				e	^{48}Ca	20-60	EE	[1969Ei03]	
^{48}Ca			0.065(27)		p	^{48}Ca	7-9	TDSA	[1968SeZZ]	
^{50}Ca			99(8)		^{50}Ca	^{1}H	90A	DSAM	[2014Ri04]	Ex
^{50}Ca			96(3)		^{48}Ca	^{208}Pb	310	RDDS	[2009Va06]	
^{42}Ti			0.56(16)		^{3}He	^{40}Ca	10.0-11.5	TDSA	[1973Ha10]	
^{42}Ti			0.75(30)		^{3}He	^{40}Ca	8.0	TDSA	[1973Co38]	
^{42}Ti			0.49($^{+23}_{-18}$)		^{3}He	^{40}Ca	6.0, 6.5, 10.0	TDSA	[1971FoZV]	
^{42}Ti			0.55($^{+30}_{-20}$)		^{3}He	^{40}Ca	5.8, 7.5	TDSA	[1971BrYK]	
^{42}Ti			1.7($^{+3}_{-5}$)		^{3}He	Ca	9-10	TDSA	[1971Bo23]	Ex
^{44}Ti			3.97(28)		^{40}Ca	C	95	TDSA	[2003Sc19]	
^{44}Ti			4.5(11)		α	^{40}Ca	4.5-6.0	TDSA	[1977Di07]	Su, NR
^{44}Ti			4.5(11)		α	^{40}Ca	4.00, 4.26, 4.52	TDSA	[1973Di04]	
^{44}Ti			5.0(20)		^{32}S	^{14}N	28	RDM	[1971HuZR]	
^{46}Ti			7.3(4)		^{28}Si	^{24}Mg	110	RDM	[2006Je04]	
^{46}Ti			7.63(7)		^{16}O	^{32}S	38	RDM	[2003Mo02]	
^{46}Ti			8.1(4)		C	^{46}Ti	110-120	TDSA,CE*	[2000Er01,2000Er06]	NR
^{46}Ti			2.0($^{+50}_{-10}$)		p	^{45}Sc	1.8	TDSA	[1983Ra17]	NR
^{46}Ti			6.7(5)					TCS	[1976Kl04]	
^{46}Ti	0.0855(40)				^{32}S	^{46}Ti	60	CE*	[1975To06]	
^{46}Ti			6.5(7)		^{16}O	^{32}S	34.5	RDM	[1973De09]	
^{46}Ti	0.0740(20)				e	^{46}Ti	250	EE	[1971He08]	
^{46}Ti	0.097(7)				^{16}O	^{46}Ti	26-31	CE*	[1971De29]	
^{46}Ti	0.111(10)				^{35}Cl	^{46}Ti	54	CE*	[1970MiZQ]	
^{46}Ti	0.107(10)				^{35}Cl	^{46}Ti	70.35-74	CE*	[1970Ha24]	
^{46}Ti			9.7(24)		γ	Ti	0.885	GG	[1967TaZZ]	
^{46}Ti			14.2(20)		γ	Ti	0.885	GG	[1963Ka29]	Ex
^{46}Ti			7.8(22)					GG	[1963Ak01]	
^{46}Ti	0.083(17)				^{14}N	^{46}Ti	16.3, 26, 36	CE*	[1960An07]	
^{46}Ti	0.130(40)				N	^{46}Ti	15.9-35	CE*	[1959Al95]	
^{46}Ti	0.056(11)				^{3}He	^{46}Ti	6-7	CE	[1956Te26]	Ex
^{48}Ti			5.7(2)		C	^{48}Ti	110-120	TDSA,CE	[2000Er01,2000Er06]*	NR

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{48}Ti			6.7(6)		γ	^{48}Ti	0.5-1.65	GG	[1981Ca10,1977Ca14]	
^{48}Ti			4.3(20)		α	^{45}Sc	9.6	TDSA	[1978Li13]	
^{48}Ti			$4.2(^{+30}_{-17})$		p	^{48}Ti	6	TDSA	[1978DeYT]	
^{48}Ti			8.29(36)		^{35}Cl	Ti	56-68	TDSA	[1973Fi15]	
^{48}Ti			6.0(13)		^{35}Cl	^{48}Ti	64	TDSA	[1973Ba02]	
^{48}Ti			5.3(8)		^{16}O	^{48}Ti		TDSA	[1972WaYZ]	
^{48}Ti	0.0537(15)				e	^{48}Ti	250	EE	[1971He08]	
^{48}Ti	0.0720(40)				^{16}O	^{48}Ti	26-31	CE*	[1971De29]	
^{48}Ti	0.081(8)				^{35}Cl	^{48}Ti	54	CE*	[1970MiZQ]	
^{48}Ti	0.069(6)				^{35}Cl	^{48}Ti	70.35-74	CE*	[1970Ha24]	
^{48}Ti			$1.2(^{+20}_{-3})$		p	^{48}Ti	7.8	TDSA	[1969Ka10]	NR
^{48}Ti	0.080(16)				^{12}C	^{48}Ti	38.6	CE*	[1967Af03]	
^{48}Ti			3.6(15)		γ	Ti	0.5-3	GG	[1964Bo22]	
^{48}Ti			7.1(22)					GG	[1963Ak02]	
^{48}Ti	0.070(14)				^{14}N	^{48}Ti	16.3, 26, 36	CE*	[1960An07]	
^{48}Ti	0.140(40)				N	^{48}Ti	15.9-35	CE*	[1959Al95]	
^{48}Ti			6.0(20)		γ	Ti	0.910-1.070	GG	[1958Kn36]	
^{48}Ti	0.031(6)				^{3}He	^{48}Ti	6-7	CE	[1956Te26]	Ex
^{50}Ti			1.73(20)		^{46}Ca	C	95	TDSA	[2003Sp04]	
^{50}Ti			1.62(7)		^{50}Ti	C	110	TDSA,CE*	[2000Sp08]	NR
^{50}Ti			1.30(40)		γ	^{50}Ti	1.3-4.7	GG	[1976Ra03]	
^{50}Ti	0.0315(30)				^{32}S	^{50}Ti	57	CE*	[1975To06]	
^{50}Ti			1.10(15)		^{16}O	^{50}Ti		TDSA	[1972WaYZ]	
^{50}Ti	0.0307(10)				e	^{50}Ti	250	EE	[1971He08]	
^{50}Ti	0.0330(30)				^{32}S	^{50}Ti	67	CE*	[1970Ha24]	
^{50}Ti	0.0173(35)				^{12}C	^{50}Ti	38.6	CE*	[1967Af03]	
^{50}Ti	0.024(2)				^{16}O	^{50}Ti	31-33	CE*	[1965Si02]	
^{50}Ti	0.040(8)				N	^{50}Ti	30	CE*	[1962Va22]	
^{52}Ti			5.2(2)		^{48}Ca	C	100	TDSA,CE*	[2006Sp02]	
^{52}Ti	0.0567(51)				^{52}Ti	^{197}Au	89A	CE*	[2005Di05]	
^{52}Ti			$4.8(^{+80}_{-21})$		t	^{50}Ti	2.9	TDSA	[1974Pr04]	NR
^{54}Ti	0.0357(63)				^{54}Ti	^{197}Au	89A	CE*	[2005Di05]	
^{56}Ti	0.060(20)				^{56}Ti	^{197}Au	89A	CE*	[2005Di05]	
^{58}Ti				δ = 0.83 (+22,−30)	p	^{58}Ti	42A	IN-EL	[2013Su20]	
^{46}Cr	0.093(20)				^{46}Cr	^{208}Pb	44A	CE*	[2005Ya26]	
^{48}Cr			10.6(11)		^{14}N	^{36}Ar	29-36	TRDM	[1979Ek03]	
^{48}Cr			16.7(22)		^{16}O	^{34}S	30-36	TRDM	[1975Ha04]	
^{48}Cr			9.7(26)		^{10}B	^{40}Ca	19-25	TRDM	[1973Ku10]	
^{50}Cr			13.2(4)		^{50}Cr	^{12}C	110-120	CE*	[2000Er01,2000Er06]	NR
^{50}Cr	0.093(5)				e	^{50}Cr	30-400	EE	[1983Li02]	
^{50}Cr	0.102(5)				^{32}S	^{50}Cr	60	CE*	[1975To06]	
^{50}Cr			12.6(21)		^{16}O	^{40}Ca	47	TDSA	[1974Br04]	
^{50}Cr			12.1(12)		^{12}C	^{40}Ca	28	TRDM	[1973De09]	
^{50}Cr			10(2)		p	^{52}Cr	31.4	TDSA	[1972Ra14]	
^{50}Cr	0.115(10)				^{35}Cl	^{50}Cr	54	CE	[1972Ra14]	
^{50}Cr	0.092(10)				^{35}Cl	^{50}Cr	21-79	CE*	[1971DaZM]	
^{50}Cr	0.115(12)			α		^{50}Cr		CE	[1961Mc18,1966Mc18]	NR
^{50}Cr	0.15(3)				Ne	^{50}Cr	23.2	CE?	[1960An09]	NR
^{52}Cr			1.13(3)		^{52}Cr	C	110-120	CE*	[2000Er01,2000Er06]	NR
^{52}Cr	0.0632(40)				e	^{52}Cr	30-400	EE	[1983Li02]	
^{52}Cr	0.0687(13)				γ	^{52}Cr	1.431	GG	[1981Ah02]	
^{52}Cr	0.080(8)				e	^{52}Cr	90, 120, 226	EE	[1978Po04]	
^{52}Cr	0.0634(39)				e	^{52}Cr	40-110	EE	[1976Li19]	
^{52}Cr	0.0660(30)				^{32}S	^{52}Cr	60	CE*	[1975To06]	
^{52}Cr	0.076(8)				e	^{52}Cr	50-100	EE	[1975DeXW]	
^{52}Cr			0.86(13)		^{16}O; ^{35}Cl	^{52}Cr	21, 79	TDSA	[1972WaYZ]	
^{52}Cr	0.071(9)				e	^{52}Cr	60, 150, 180, 250	EE	[1971Pe11]	
^{52}Cr			$0.99(^{+45}_{-25})$		^{3}He	^{51}V	11	TDSA	[1971Sp12]	
^{52}Cr	0.072(8)				^{16}O; ^{35}Cl	^{52}Cr	21-30; 60-79	CE*	[1971DaZM]	
^{52}Cr	0.043(9)				^{12}C	^{52}Cr	36.8	CE*	[1967Af03]	
^{52}Cr	0.048(2)				^{16}O	^{52}Cr	33.8, 35.6	CE*	[1965Si02]	
^{52}Cr	0.0520(40)				e	^{52}Cr	150-180	EE	[1964Be32]	
^{52}Cr			1.02(13)		γ	^{52}Cr	0.5-3.0	GG	[1964Bo22]	
^{52}Cr	0.072(9)				α	^{52}Cr		CE	[1961Mc18,1966Mc18]	NR
^{52}Cr	0.062(12)				Ne	^{52}Cr	23.2	CE?	[1960An09]	NR
^{52}Cr	0.060(15)				^{16}O	^{52}Cr	39	CE*	[1960Ad01]	
^{52}Cr			0.8(2)		γ	^{52}Cr	<2	GG	[1959Of14]	
^{54}Cr	0.095(5)				e	^{54}Cr	30-400	EE	[1983Li02]	
^{54}Cr	0.0850(30)				^{32}S	^{54}Cr	60	CE*	[1975To06]	
^{54}Cr	0.096(9)				^{35}Cl	^{54}Cr	54	CE	[1970MiZQ]	
^{54}Cr	0.10(1)				α	^{54}Cr		CE	[1961Mc18,1966Mc18]	NR
^{54}Cr	0.057(11)				^{14}N	^{54}Cr	16, 26	CE	[1960An07]	
^{54}Cr	0.079(20)				^{14}N	^{54}Cr	15.9-35	CE	[1959Al95]	
^{56}Cr		8.7(30)			^{56}Cr	^{197}Au	100A	CE*	[2005Bu29]	
^{58}Cr			6.8(9)		^{59}Mn	^{9}Be	92.1A	RDM	[2015Br10]	
^{58}Cr	0.0860(125)				^{58}Cr	^{197}Au	81.1A	CE*	[2012Ba31]	
^{58}Cr		14.8(42)			^{58}Cr	^{197}Au	100A	CE*	[2005Bu29]	

(*continued on next page*)

Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{60}Cr			26.5(32)		^{61}Mn	^{9}Be	91.9A	RDM	[2015Br10]	
^{60}Cr	0.1105(145)				^{60}Cr	^{197}Au	81.7A	CE*	[2012Ba31]	
^{60}Cr				0.23(3)	^{60}Cr	p	63A	IN-EL	[2009Ao01]	
^{62}Cr			125(13)		^{63}Mn	^{9}Be	98A	RDM	[2015Br10]	
^{62}Cr	0.1625(220)				^{62}Cr	^{197}Au	79A	CE*	[2012Ba31]	
^{62}Cr				0.27(3)	^{60}Cr	p	63A	IN-EL	[2009Ao01]	
^{64}Cr	0.1561(396)				^{64}Cr	Bi	<130A	CE*	[2013Cr02]	
^{50}Fe	0.1400(300)				^{50}Fe	Pb	41A	CE*	[2005Ya26]	
^{52}Fe	0.0817(102)				^{52}Fe	^{197}Au	59.6A	CE*	[2004Yu07]	
^{54}Fe	0.0676(38)				^{40}Ca	^{54}Fe	86	CE	[1981Le02]	
^{54}Fe	0.060(6)				e	^{54}Fe	50,60, 80,90	EE	[1975DeXW]	
^{54}Fe			$1.10(^{+50}_{-32})$		p	^{54}Fe	10	TDSA	[1972Mo31]	
^{54}Fe			0.95(14)		^{16}O, ^{35}Cl	^{54}Fe	21-30, 60-79	TDSA	[1972WaYZ]	
^{54}Fe	0.0532(33)				e	^{54}Fe	150, 225	EE	[1972Li28]	
^{54}Fe	0.0595(60)				^{16}O, ^{35}Cl	^{54}Fe	21-30, 60-79	CE*	[1971DaZM]	
^{54}Fe	0.061(14)				^{12}C	^{54}Fe	36.8	CE*	[1967Af03]	
^{54}Fe	0.051(2)				^{16}O	^{54}Fe	38.1	CE*	[1965Si02]	
^{54}Fe	0.0533(24)				e	^{54}Fe	150	EE	[1962Be18]	
^{56}Fe	0.1022(55)				^{52}Cr	^{12}C; ^{56}Fe	22; 110-120	CE*	[1981Le02]	
^{56}Fe			7.9(12)		^{7}Li	^{51}V	25	RDM	[1974Po15]	
^{56}Fe	0.111(6)				α, ^{16}O	^{56}Fe	8, 28	CE	[1972Ca05]	
^{56}Fe	0.0970(20)				^{32}S	^{56}Fe	65	CE*	[1972Le19]	
^{56}Fe	0.0678(48)				e	^{56}Fe	150, 225	EE	[1972Li28]	
^{56}Fe	0.0945(45)				e	^{56}Fe	299.5	EE	[1971He08]	
^{56}Fe	0.1176(118)				^{16}O, ^{35}Cl	^{56}Fe	21-30, 60-79	CE*	[1971DaZM]	
^{56}Fe	0.125(27)				e	^{56}Fe	60.2	EE	[1970Pe15]	
^{56}Fe			10.3(20)		^{16}O	^{56}Fe	14-35	TDSA	[1969Sp05]	
^{56}Fe			$11.3(^{+40}_{-24})$		^{16}O	^{56}Fe	34	TDSA	[1965Es01]	
^{56}Fe	0.097(10)				^{16}O	^{56}Fe	33	CE*	[1964El03]	
^{56}Fe			8.5(29)		γ	^{56}Fe	0.5-3	GG	[1964Bo22]	
^{56}Fe			9.6(18)		γ	^{56}Fe	0.5-2.4	GG	[1963Be29]	
^{56}Fe	0.0720(35)				e	^{56}Fe	150	EE	[1962Be18]	
^{56}Fe			10.6(17)		γ	^{56}Fe		GG	[1961Me11]	
^{56}Fe			8.6(29)		γ	^{56}Fe		GG	[1961Ke06]	
^{56}Fe	0.100(20)				^{16}O	^{56}Fe	36	CE	[1960Go08]	
^{56}Fe	0.061(12)				^{14}N	^{56}Fe	16.3, 36	CE*	[1960An07]	
^{56}Fe	0.100(25)				^{16}O	^{56}Fe	39	CE*	[1960Ad01]	
^{56}Fe	0.070(18)				N	^{56}Fe	15.9-35	CE*	[1959Al95]	
^{56}Fe	0.100(20)				α	^{56}Fe	7	CE	[1956Te26]	
^{58}Fe	0.1234(36)				^{12}C; ^{52}Cr	^{58}Fe	22; 110-120	CE*	[1981Le02]	
^{58}Fe			$3.4(^{+10}_{-9})$		α	^{58}Fe	10	TDSA	[1978Bo35]	
^{58}Fe	0.086(5)				^{40}Ca	^{58}Fe	76	CE*	[1974ToZJ]	
^{58}Fe	0.094(8)				e	^{58}Fe	150, 225	EE	[1972Li28]	
^{58}Fe	0.110(22)				^{14}N	^{58}Fe	16.3	CE	[1960An07]	
^{58}Fe	0.20(5)				N	^{58}Fe	15.9-35	CE*	[1959Al95]	
^{60}Fe			11.6(22)		^{15}N; ^{18}O	^{48}Ca	25-55	RDM	[1977Wa10]	
^{60}Fe			11.4(12)		^{238}U	^{64}Ni	6.5A	RDM	[2010Lj01]	
^{62}Fe			8.0(10)		^{62}Fe	^{197}Au	97.8A	RDM	[2011Ro02]	
^{62}Fe			7.4(9)		^{238}U	^{64}Ni	6.5A	RDM	[2010Lj01]	
^{64}Fe			10.3(10)		^{64}Fe	^{197}Au	95A	RDM	[2011Ro02]	
^{64}Fe			7.4(26)		^{238}U	^{64}Ni	6.5A	RDM	[2010Lj01]	
^{66}Fe	0.1445(124)				^{66}Fe	Bi	<130A	CE*	[2013Cr02]	
^{66}Fe			39.4(40)		^{64}Fe	^{197}Au	88.3A	RDM	[2011Ro02]	
^{68}Fe	0.1777(216)				^{68}Fe	Bi	<130A	CE*	[2013Cr02]	
^{54}Ni	0.0590(170)				^{54}Ni	Pb	42A	CE*	[2005Ya26]	
^{54}Ni	0.0626(169)				^{54}Ni	^{197}Au	70.3A	CE*	[2004Yu10]	
^{56}Ni	0.0494(119)				^{56}Ni	^{197}Au	85.8A	CE*	[2004Yu10]	
^{56}Ni				0.144(34)	^{56}Ni	^{208}Pb	70.7A	CE*	[1998YaZR]	NR
^{56}Ni			$0.076(^{+49}_{-24})$		^{3}He	^{54}Fe	10	TDSA	[1973Sc28]	
^{58}Ni	0.0630(40)				^{58}Ni	C	1.8A	CE	[2014Al20]	
^{58}Ni			$1.00(^{+15}_{-10})$		n	Ni	1.6, 1.8	TDSA	[2008Or02]	
^{58}Ni	0.0707(145)				^{58}Ni	^{197}Au	77.8A	CE*	[2004Yu10]	
^{58}Ni			1.27(2)		^{58}Ni	^{12}C	155, 160	TDSA	[2001Ke08]	
^{58}Ni			0.042(12)		n	Ni	fast	TDSA	[1989Ge09,1983El03]	Ex, NR
^{58}Ni	0.0588(40)				e	^{58}Ni	124, 180	EE	[1983Kl09]	
^{58}Ni			0.90(11)		γ	^{58}Ni	0.5-1.65	GG	[1981Ca10]	
^{58}Ni			0.92(17)		p	^{58}Ni	8	TDSA	[1973BeYD]	
^{58}Ni	0.0660(40)				^{16}O	^{58}Ni	35-60	CE*	[1973Ch13]	
^{58}Ni			1.07(8)		γ	^{58}Ni		GG	[1972ArZD]	
^{58}Ni	0.0680(20)				^{16}O	^{58}Ni	30, 32, 34	CE*	[1971ChZF]	
^{58}Ni			0.98(9)		γ	^{58}Ni	<4.5	GG	[1970Me18]	
^{58}Ni	0.0725(20)				^{12}C, ^{16}O, ^{32}S	^{58}Ni	21-22, 25-30, 60-70	CE*	[1970Le17,1974Le13]	NR
^{58}Ni	0.0554(30)				e	^{58}Ni	150, 225	EE	[1969Af01]	
^{58}Ni			0.94(12)		p	^{58}Ni	7-9	TDSA	[1969Be48]	
^{58}Ni	0.0657(11)				e	^{58}Ni	40-70	EE	[1967Du07]	
^{58}Ni			0.62(20)		γ	^{58}Ni	0.5-3.0	GG	[1964Bo22]	
^{58}Ni	0.072(7)				α	^{58}Ni	3-10	CE	[1962St02]	
^{58}Ni	0.098(13)				e	^{58}Ni	183	EE	[1961Cr01]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{58}Ni	0.063(13)				^{16}O	^{58}Ni	36	CE*	[1960Go08]	
^{58}Ni	0.080(16)				^{14}N	^{58}Ni	36	CE*	[1960An07]	
^{58}Ni	0.071(14)				α	^{58}Ni		CE?	[1960An07]	
^{58}Ni	0.100(25)				N ions	^{58}Ni	15.9-35	CE	[1959Al95]	Su
^{60}Ni	0.0906(41)				^{60}Ni	C	1.8A	CE	[2014Al20]	
^{60}Ni			>0.500(17)		γ	^{60}Ni	<6	GG	[2013Sc20]	
^{60}Ni			$1.30(^{+30}_{-20})$		n	^{60}Ni	1.8	TDSA	[2008Or02]	
^{60}Ni			1.31(3)		^{60}Ni	^{12}C	160	TDSA	[2001Ke02,2001Ke08]	
^{60}Ni			1.30(36)		N/A	N/A	N/A	TCS	[1976Kl04]	
^{60}Ni	0.1020(40)				e	^{60}Ni	30-60	EE	[1974Ye01]	
^{60}Ni	0.087(7)				e	^{60}Ni	45-250	EE	[1974Si01]	
^{60}Ni			1.00(7)		^{35}Cl	^{60}Ni	56-68	TDSA	[1973Fi15]	
^{60}Ni			$0.8(^{+15}_{-3})$		p	^{60}Ni	12	TDSA	[1973Ro20]	NR
^{60}Ni	0.082(6)				γ	^{60}Ni		GG	[1972ArZD]	
^{60}Ni	0.0910(30)				^{16}O	^{60}Ni	36	CE	[1971ChZF]	
^{60}Ni	0.092(12)				γ	^{60}Ni	<4.5	GG	[1970Me18]	
^{60}Ni	0.0938(20)				γ	^{60}Ni	1.333	GG	[1970Me08]	
^{60}Ni	0.0930(20)				^{16}O, ^{32}S	^{60}Ni	70	CE*	[1969Cl05,1974Le13]	NR
^{60}Ni	0.0603(28)				e	^{60}Ni	150,225	EE	[1969Af01]	
^{60}Ni	0.077(8)				e	^{60}Ni	183,250	EE	[1969To08]	
^{60}Ni	0.112(23)				γ	^{60}Ni	1-2	GG	[1967Be39]	
^{60}Ni	0.0845(9)				e	^{60}Ni	40-70	EE	[1967Du07]	
^{60}Ni	0.091(5)				α	^{60}Ni	3-10	CE	[1962St02]	
^{60}Ni	0.123(15)				e	^{60}Ni	183	EE	[1961Cr01]	
^{60}Ni	0.11(1)				^{14}N	^{60}Ni	36	CE*	[1960An07]	
^{60}Ni	0.120(24)				^{16}O	^{60}Ni	36	CE*	[1960Go08]	
^{60}Ni			1.0(3)		γ	^{60}Ni	133	GG	[1959Bu12]	
^{60}Ni	0.160(40)				^{14}N	^{60}Ni	15.9-35	CE	[1959Al95]	
^{60}Ni			1.1(2)		γ	^{60}Ni	U	GG	[1956Me59]	
^{62}Ni	0.0906(37)				^{62}Ni	C	1.8A	CE	[2014Al20]	
^{62}Ni			$1.79(^{+86}_{-48})$		n	^{62}Ni	2.8-4.1	TDSA	[2011Ch05]	
^{62}Ni			2.01(7)		^{62}Ni	^{12}C	160	TDSA	[2001Ke02]	
^{62}Ni			2.15(42)		γ	^{62}Ni	0.5-1.65	GG	[1981Ca10]	
^{62}Ni			1.55(25)		α	59Co	10	TDSA	[1978Ke11]	
^{62}Ni			1.55(25)		α	59Co	10	TDSA	[1978KlZR]	Su
^{62}Ni			$1.6(^{+4}_{-6})$		α	59Co	8	TDSA	[1978Oh04]	NR
^{62}Ni			2.1(5)		γ	^{62}Ni	0.5-1.65	GG	[1977Ca14]	Su
^{62}Ni	0.102(10)				e	^{62}Ni	50-100	EE	[1975DeXW]	
^{62}Ni	0.0618(42)				e	^{62}Ni	150, 225	EE	[1972Li28]	
^{62}Ni	0.0880(30)				^{16}O	^{62}Ni	34	CE	[1971ChZF]	
^{62}Ni	0.0895(30)				^{16}O	^{62}Ni	70	CE*	[1970Le17,1974Le13]	NR
^{62}Ni	0.084(5)				^{28}Si	^{62}Ni	70	CE*	[1969Ha31]	
^{62}Ni	0.0877(11)				e	^{62}Ni	65	EE	[1967Du07]	
^{62}Ni			2.28(18)		^{16}O	^{62}Ni	36	TDSA	[1965Es01]	
^{62}Ni	0.083(8)				α	^{62}Ni	6	CE	[1962St02]	
^{62}Ni	0.085(17)				^{14}N	^{62}Ni	36	CE*	[1960An07]	
^{62}Ni	0.140(35)				^{14}N	^{62}Ni	15.9-35	CE	[1959Al95]	Su
^{64}Ni	0.0718(29)				^{64}Ni	C	1.8A	CE	[2014Al20]	
^{64}Ni			1.57(5)		^{64}Ni	^{12}C	155, 160	TDSA	[2001Ke08]	
^{64}Ni			0.025(12)		n	^{64}Ni	fast	TDSA	[1989Ge09,1983El03]	Ex, NR
^{64}Ni	0.0744(20)				e	^{64}Ni	147.4-356.0	EE	[1988Br10]	
^{64}Ni			0.40(15)		α	^{64}Ni	13	TDSA	[1974Iv01]	
^{64}Ni	0.0650(40)				^{16}O	^{64}Ni	30, 32, 34	CE	[1971ChZF]	
^{64}Ni	0.0650(34)				e	^{64}Ni	150, 225	EE	[1969Af01]	
^{64}Ni	0.087(17)				^{14}N	^{64}Ni	36.0	CE*	[1960An07]	
^{64}Ni	0.077(15)				α	^{64}Ni		CE*	[1960An07]	
^{64}Ni	0.090(18)				N ions	^{64}Ni	15.9-35	CE	[1959Al95]	Su
^{66}Ni	0.06(1)				^{66}Ni	^{208}Pb	50A	CE*	[2002So03]	
^{68}Ni	0.028(11)				^{68}Ni	^{108}Pd	2.9A	CE*	[2008Br18]	
^{68}Ni	0.0255(60)				^{66}Ni	^{208}Pb	50A	CE*	[2002So03]	
^{70}Ni	0.086(14)				^{70}Ni	^{208}Pb	0.28c	CE*	[2006Pe13]	
^{74}Ni	$0.0642(^{+216}_{-226})$				^{74}Ni	^{197}Au	95.8A	CE*	[2014Ma85]	
^{74}Ni				0.21(3)	^{74}Ni	p	81A	IN-EL	[2010Ao01]	
^{62}Zn			4.2(7)		^{63}Zn	C	9450	RDM	[2007St16]	
^{62}Zn			4.3(3)		^{62}Zn	Fe	160	TDSA	[2002Ke02]	
^{62}Zn			4.20(30)		^{6}Li	^{58}Ni	15-24	TDSA	[1981Wa09]	
^{62}Zn			$1.7(^{+7}_{-14})$		α	^{61}Ni	30	TDSA	[1977BrYO]	
^{64}Zn			2.85(9)		^{64}Zn	C	180	TDSA	[2005Le12]	
^{64}Zn			2.70(8)		^{64}Zn	Fe	160	TDSA	[2002Ke02]	
^{64}Zn	0.112(6)				p	^{64}Zn	2-4.5	CE	[1998Si25]	NR
^{64}Zn	0.168(4)				α, ^{16}O, ^{18}O	^{64}Zn	8,35,30	CE	[1988Sa32]	
^{64}Zn			2.97(25)		γ	^{64}Zn	1.65	GG	[1981Ca10]	
^{64}Zn			3.00(30)		γ	^{64}Zn	1.65	GG	[1977Ca14]	Su
^{64}Zn			4.0(10)		^{16}O	^{51}V	49	RDM	[1977Al14]	
^{64}Zn	0.162(9)				e	^{64}Zn	100-275	EE	[1977Ne05]	
^{64}Zn	0.155(9)				e	^{64}Zn	40-112	EE	[1976Ne06]	
^{64}Zn			2.9(7)		α	^{61}Ni	6.4-8	TDSA	[1976Ch11]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{64}Zn	0.161(12)				α	^{64}Zn	3-5	CE*	[1975Th01]	
^{64}Zn	0.176(21)				^{35}Cl	^{64}Zn	56-68	CE	[1973Fi15]	
^{64}Zn	0.155(11)				γ	^{64}Zn	U	GG	[1972ArZD]	
^{64}Zn			3.11(22)		γ	^{64}Zn		GG	[1971ImZY]	NR
^{64}Zn	0.170(16)				e	^{64}Zn	150-225	EE	[1970Af04]	
^{64}Zn	0.108(5)				γ	^{64}Zn	U	GG	[1965Ta13]	
^{64}Zn	0.162(10)				α	^{64}Zn	3-10	CE	[1962St02]	
^{64}Zn	0.110(22)				^{14}N	^{64}Zn	36	CE*	[1960An07]	
^{64}Zn	0.110(22)				α	^{64}Zn	<7	CE	[1956Te26]	
^{66}Zn			2.5(1)		^{66}Zn	C	180	TDSA	[2006Le24]	
^{66}Zn	0.144(9)				^{66}Zn	Pb	274.2	CE*	[2003Ko51]	
^{66}Zn			2.43(5)		^{66}Zn	Fe	160	TDSA	[2002Ke02]	
^{66}Zn	0.135(8)				p	^{66}Zn	2-4.5	CE*	[1998Si25]	NR
^{66}Zn			2.71(23)		γ	^{66}Zn	1.65	GG	[1981Ca10]	
^{66}Zn			2.0(10)		α	^{63}Cu	16.7	TDSA	[1981Zh07]	
^{66}Zn			2.70(20)		γ	^{66}Zn	1.65	GG	[1977Ca14]	Su
^{66}Zn	0.141(8)				e	^{66}Zn	100-275	EE	[1977Ne05]	
^{66}Zn			$2.5(^{+5}_{-2})$		α	^{66}Zn	27,30	TDSA	[1977Mo20]	
^{66}Zn	0.137(10)				e	^{66}Zn	40-112	EE	[1976Ne06]	
^{66}Zn	0.154(13)				α	^{66}Zn	3-5	CE	[1975Th01]	
^{66}Zn	0.180(15)				e	^{66}Zn	225	EE	[1973Li24]	
^{66}Zn	0.155(13)				^{35}Cl	^{66}Zn	56-68	CE	[1973Fi15]	
^{66}Zn			2.2(9)		α	^{66}Zn	25	TDSA	[1972Yo01]	
^{66}Zn	0.156(21)				γ	^{66}Zn	1.037	GG	[1972Ka22]	
^{66}Zn	0.138(16)				γ	^{66}Zn	U	GG	[1972ArZD]	
^{66}Zn	0.145(15)				e	^{66}Zn	150-225	EE	[1970Af04]	
^{66}Zn	0.15(6)				γ	^{66}Zn	U	GG	[1967Be39]	
^{66}Zn	0.145(13)				α	^{66}Zn	3-10	CE	[1962St02]	
^{66}Zn	0.110(22)				^{14}N	^{66}Zn	36	CE*	[1960An07]	
^{66}Zn	0.087(17)				α	^{66}Zn	<7	CE	[1956Te26]	
^{68}Zn			2.34(4)		^{68}Zn	C	180	TDSA	[2005Le12,2005Le38]	
^{68}Zn	0.129(8)				^{68}Zn	Pb	276	CE*	[2004Ko03]	
^{68}Zn			2.32(7)		^{68}Zn	Fe	161	TDSA	[2002Ke02]	
^{68}Zn	0.105(7)				p	^{68}Zn	2-4.5	CE*	[1998Si25]	NR
^{68}Zn			2.71(23)		γ	^{68}Zn	1.65	GG	[1981Ca10]	
^{68}Zn	0.125(11)				e	^{68}Zn	100-275	EE	[1977Ne05]	
^{68}Zn	0.105(8)				γ	^{68}Zn	1.65	GG	[1977Ca14]	Su
^{68}Zn	0.111(8)				e	^{68}Zn	40-112	EE	[1976Ne06]	
^{68}Zn			1.3(3)		α	^{68}Zn	13	TDSA	[1974Iv01]	
^{68}Zn	0.126(13)				^{35}Cl	^{68}Zn	56-68	CE	[1973Fi15]	
^{68}Zn	0.108(14)				e	^{68}Zn	225	EE	[1973Li24]	
^{68}Zn	0.140(16)				γ	^{68}Zn		GG	[1972ArZD]	
^{68}Zn	0.125(11)				α	^{68}Zn	3-10	CE	[1962St02]	
^{68}Zn	0.110(22)				^{14}N	^{68}Zn	36	CE*	[1960An07]	
^{70}Zn			5.3(17)		^{72}Zn	^{238}U	<540	RDM	[2013Lo04]	
^{70}Zn			5.2(5)		^{238}U	^{72}Zn	6.76A	TDSA	[2013Ce01]	
^{70}Zn	0.164(28)				^{72}Zn	^{58}Ni	4613	CE*	[2002So03]	
^{70}Zn			5.3(3)		^{72}Zn	Fe	162	TDSA	[2002Ke02]	
^{70}Zn	0.235(25)				p	^{72}Zn	2-4.5	CE*	[1998Si25]	NR
^{70}Zn	0.205(19)				e	^{72}Zn	40-112	EE	[1976Ne06]	
^{70}Zn	0.160(14)				α	^{72}Zn	3-10	CE	[1962St02]	
^{72}Zn			17.6 (14)		^{72}Zn	^{238}U	<540	RDM	[2013Lo04]	
^{72}Zn			19.4(55)		^{238}U	^{72}Zn	6.76A	TDSA	[2013Ce01]	
^{72}Zn			17.9(18)		^{73}Zn	^{9}Be	<60A	RDM	[2012Ni09]	
^{72}Zn	0.174(21)				^{72}Zn	Pb	2520	CE*	[2002Le17]	
^{74}Zn			28.5 (36)		^{74}Zn	^{238}U	<540	RDM	[2013Lo04]	
^{74}Zn			27.0(24)		^{74}Zn	^{9}Be	<60A	RDM	[2012Ni09]	
^{74}Zn	0.201(16)				^{74}Zn	^{108}Pd, ^{120}Sn	212.38	CE*	[2007Va20,2009Va01]	
^{74}Zn	0.204(15)				^{74}Zn	^{208}Pb	0.28c	CE*	[2006Pe13]	
^{76}Zn	0.145(18)				^{76}Zn	^{108}Pd, ^{120}Sn	218.12	CE*	[2007Va20,2009Va01]	
^{78}Zn	0.077(19)				^{78}Zn	^{108}Pd, ^{120}Sn	223.86	CE*	[2007Va20,2009Va01]	
^{80}Zn	0.073(9)				^{80}Zn	^{108}Pd, ^{120}Sn	229.6	CE*	[2007Va20,2009Va01]	
^{64}Ge			3.3(5)		^{64}Ge	C	<150A	RDM	[2007St16]	
^{66}Ge	0.1401(69)				^{66}Ge	^{197}Au	70A	CE*	[2013Co23]	
^{66}Ge			3.8(5)		^{10}B	^{58}Ni	28	RDM	[2012Lu03]	
^{66}Ge			5.3(10)		^{10}B	^{58}Ni	29	RDM	[1979Wa23]	Ex
^{68}Ge			3.1(3)		^{12}C	^{58}Ni	38	RDM	[2012Lu03]	
^{68}Ge			3.1(2)		^{64}Zn	^{12}C	180	TDSA	[2005Le19]	
^{68}Ge			2.6(3)		^{7}Li	^{64}Zn	15-18	TDSA	[1982Pa03]	
^{68}Ge			3(1)		^{12}C	^{58}Ni	39	TDSA	[1981De03]	
^{68}Ge			$5(^{+3}_{-2})$		α	^{66}Zn	30	TDSA	[1977Mo20]	
^{68}Ge			2(1)		^{12}C	^{58}Ni	36	RDM	[1977Gu08]	
^{70}Ge			1.9(2)		^{66}Zn	^{12}C	180	TDSA	[2006Le31]	
^{70}Ge			1.9(5)		n	^{70}Ge	fast	TDSA	[1988DoZU]	NR
^{70}Ge			1.9(5)		α	^{67}Zn	10-16	RDM	[1984Ef01]	
^{70}Ge	0.179(3)				^{6}Li, ^{16}O	^{70}Ge	10.5, 29.9	CE	[1980Le16]	
^{70}Ge			$2.2(^{+2}_{-1})$		α	^{68}Zn	30	TDSA	[1977Mo20]	
^{70}Ge			1.92(5)		^{18}O	^{56}Fe	60	RDM	[1976He05]	Ex

(*continued on next page*)

Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{70}Ge		19.7(12)			e	^{70}Ge	84-120	EE	[1975Kl10]	
^{70}Ge	0.1790(30)				α; ^{18}O	^{70}Ge	8.0,8.5; 32.8-40	CE	[1969Si15]	
^{70}Ge	0.150(30)							CE	[1962Ga19]	
^{70}Ge	0.18(6)				^{14}N	^{70}Ge	36	CE*	[1962Ga13]	
^{70}Ge	0.180(27)				^{14}N	^{70}Ge	36	CE*	[1962Er05]	
^{70}Ge	0.172 ($^{+21}_{-15}$)				α	^{70}Ge	6-8	CE	[1962St02]	
^{70}Ge	0.098(20)				α	^{70}Ge	7	CE	[1956Te26]	
^{72}Ge	0.212(5)				^{72}Ge, ^{58}Ni	^{208}Pb, ^{72}Ge	270, 155	CE*	[1990Ko38]	
^{72}Ge			5.2(4)		n	^{72}Ge	fast	TDSA	[1988DoZU]	NR
^{72}Ge	0.208(3)				α, ^{16}O	^{72}Ge	7.0, 29.9	CE	[1980Le16]	
^{72}Ge			4 ($^{+3}_{-1}$)		α	^{72}Zn	22-35	TDSA	[1979Mo01]	
^{72}Ge			4.54(10)		^{18}O	^{58}Fe	60	RDM	[1976He05]	Ex
^{72}Ge		26.8(20)			e	^{72}Ge	84-120	EE	[1975Kl10]	
^{72}Ge			4.6(8)		γ	^{72}Ge		GG	[1973KaZV]	
^{72}Ge	0.18(2)				α	Ge	2.6, 3.0, 3.4, 3.6, 3.8, 4.0	CE	[1972Sa27]	
^{72}Ge	0.230 ($^{+28}_{-21}$)				α	^{72}Ge	4.5-8	CE	[1962St02]	
^{72}Ge	0.21(7)				^{14}N	^{72}Ge	36	CE*	[1962Ga13]	
^{72}Ge	0.210(30)				^{14}N	^{72}Ge	36	CE*	[1962Er05]	
^{72}Ge			4.6(12)		γ	^{72}Ge	0.834	GG	[1956Me13]	
^{72}Ge	0.160(32)				α	^{72}Ge	7	CE	[1956Te26]	
^{74}Ge	0.302(2)				^{74}Ge	Pb	300	CE*	[2000To12]	NR
^{74}Ge			17.0($^{+16}_{15}$)		n	^{74}Ge	fast	TDSA	[1988DoZU]	NR
^{74}Ge	0.305(3)				α, ^{16}O	^{74}Ge	7.0, 29.9	CE	[1980Le16]	
^{74}Ge	0.29(2)				α	Ge	2.6, 3.0, 3.4, 3.6, 3.8, 4.0	CE	[1972Sa27]	
^{74}Ge	0.317($^{+38}_{-29}$)				α	^{74}Ge	3-10	CE	[1962St02]	
^{74}Ge	0.32(3)				^{14}N	^{74}Ge	36	CE*	[1962Ga13]	
^{74}Ge	0.300(45)				^{14}N	^{74}Ge	36	CE*	[1962Er05]	
^{74}Ge	0.32(3)				d, p	^{74}Ge	3.5-4	CE	[1960Wi18]	
^{74}Ge			19(3)		γ	^{74}Ge	0.834	GG	[1956Me13]	
^{74}Ge	0.250(38)				α	^{74}Ge	7	CE	[1956Te26]	
^{76}Ge			26.6(6)		^{76}Ge	^{238}U	<540	RDM	[2013Lo04]	
^{76}Ge	0.299(27)				^{76}Ge	^{208}Pb	60A	CE*	[2006Pe13]	
^{76}Ge	0.2923(346)				^{76}Ge	^{197}Au	81A	CE*	[2005Di05]	
^{76}Ge			26.3(30)		n	^{76}Ge	fast	TDSA	[1988DoZU]	NR
^{76}Ge	0.278(3)				α, ^{16}O	^{76}Ge	7.0, 29.9	CE	[1980Le16]	
^{76}Ge	0.27(2)				α	Ge	2.6, 3.0, 3.4, 3.6, 3.8, 4.0	CE	[1972Sa27]	
^{76}Ge	0.260(5)				α, ^{18}O	^{76}Ge	5-11, 34.0	CE	[1969Si15]	
^{76}Ge	0.263 ($^{+32}_{-24}$)				α	^{76}Ge	3-10	CE	[1962St02]	
^{76}Ge	0.280(42)				^{14}N	^{76}Ge	36	CE*	[1962Er05]	
^{76}Ge	0.29(3)				d, p	^{76}Ge	3.5-3.8	CE	[1960Wi18]	
^{76}Ge	0.230(35)				α	^{76}Ge	7	CE	[1956Te26]	
^{78}Ge	0.222(14)				^{78}Ge	C	2.24A	CE*	[2005Pa23]	
^{78}Ge	≈0.2				^{78}Ge	Pb	40A	CE*	[2005Iw03]	Ex
^{78}Ge			23(4)			^{78}Ga(β^-)		DC	[1993Ch05]	NR
^{80}Ge	0.139(27)				^{80}Ge	C	2.24A	CE*	[2005Pa23]	
^{80}Ge	≈0.1				^{78}Ge	Pb	40A	CE*	[2005Iw03]	Su
^{82}Ge	0.128(22)				^{82}Ge	^{197}Au	89.4A	CE*	[2010Ga14]	
^{82}Ge	0.115(20)				^{82}Ge	^{48}Ti	220	CE*	[2005Pa23]	
^{82}Ge	≈0.1				^{78}Ge	Pb	40A	CE*	[2005Iw03]	Ex
^{68}Se			4.60(82)		^{68}Se	^{9}Be	<150A	RDM	[2014Ni09]	
^{68}Se	0.2158(290)				^{68}Se	^{197}Au	92A	CE*	[2009Ob02]	
^{70}Se			3.28(37)		^{70}Se	^{9}Be	<150A	RDM	[2014Ni09]	
^{70}Se			3.2(2)		^{36}Ar	^{40}Ca	136	RDM	[2008Lj01]	
^{70}Se			1.5(3)		^{36}Ar and ^{14}N	^{40}Ca, ^{58}Ni	115 and 39	RDM	[1986He17]	Ex
^{70}Se			1.60(40)		^{14}N	^{58}Ni	36	RDM	[1975GuYV]	Ex
^{72}Se		22.9(16)						GG	[2011Mc01]	
^{72}Se			4.2(3)		^{36}Ar	^{40}Ca	136	RDM	[2008Lj01]	
^{72}Se					^{24}Mg	^{54}Fe	104	RDM	[2001Pa03]	Ex
^{72}Se			2.6(1)		^{24}Mg	^{54}Fe	75, 80	TDSA	[1998Sk01]	Ex, NR
^{72}Se			4.3(5)					TDSA	[1988MyZY]	
^{72}Se			3.8(7)		^{36}Ar, ^{14}N	^{40}Ca, ^{60}Ni	115, 39	RDM	[1986He17]	
^{72}Se			4.8(6)		^{16}O	^{58}Ni	42	TDSA	[1979Ki17]	
^{72}Se			5.2(5)		^{16}O	^{58}Ni	46, 48, 56, 58	RDM	[1978He13]	
^{72}Se			5.7(12)		^{16}O	^{58}Ni	46	TDSA	[1976Ha01]	NR
^{72}Se			3.1(6)		^{16}O	^{58}Ni	40, 42, 45	RDM	[1975Lo08]	
^{72}Se			5.1(6)		^{14}N, ^{12}C	^{58,60}Ni	36, 42	TDSA	[1975GuYW]	
^{72}Se			5.7(12)		^{16}O	^{58}Ni	44-46	RDM	[1974SaZH]	Su
^{74}Se	0.36(2)				^{70}Se	^{104}Pd	206	CE*	[2007Hu03]	
^{74}Se			14(4)		α, ^{12}C	^{73}Ge, ^{65}Cu	40, 42	RDM	[1989Ad01]	NR
^{74}Se			10.6(8)		^{14}N	^{63}Cu	50	TDSA	[1979Ki17]	
^{74}Se	0.387(5)				α, ^{16}O	^{74}Se	7.3, 33-34	CE	[1978Le22]	
^{74}Se	0.370(15)				^{16}O	^{74}Se	39.2	CE*	[1974Ba80]	
^{74}Se	0.42(13)				α	^{74}Se	5	CE	[1970AgZV]	
^{74}Se	0.44(15)				α	^{74}Se	8.5	CE	[1962Ga13]	
^{74}Se	0.44(8)				^{14}N	^{74}Se	18	CE	[1961An07]	
^{74}Se	0.210(30)				α	^{74}Se	7	CE	[1956Te26]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{74}Se			6(3)					GG	[1955Me10]	
^{76}Se	0.419(43)				^{48}Ti, ^{208}Pb	^{76}Se	186, 934	CE*	[1995Ka29]	
^{76}Se	0.425(9)				α	^{74}Ge	18, 21, 24, 25.5	RDM/ TDSA	[1984ZoZZ]	NR
^{76}Se	0.423(6)				^{16}O, α	^{76}Se	30.0, 6.6-7.3	CE	[1977Le11]	
^{76}Se	0.42(2)				^{16}O, α	^{76}Se	39.2, 6.6-7.3	CE*	[1974Ba80]	Su
^{76}Se	0.390(40)				α	^{76}Se	5	CE	[1970AgZV]	
^{76}Se			15.5($^{+13}_{-19}$)		γ	^{76}Se	0.559	GG	[1963Pr04]	
^{76}Se	0.45(4)				α	^{76}Se	8.5	CE	[1962Ga13]	
^{76}Se	0.480(43)				α	^{76}Se	5-8	CE	[1962St02]	
^{76}Se	0.42(8)				^{14}N	^{76}Se	16.3, 36.0	CE*	[1960An07]	
^{76}Se			13(2)		γ	^{76}Se		GG	[1960De08]	
^{76}Se	0.43(6)				α	^{76}Se	7	CE	[1956Te26]	
^{76}Se			33(22)					DC	[1955Co55]	
^{78}Se	0.325(45)				^{78}Se	Pb	320	CE*	[2003Ha15]	
^{78}Se			12(2)		α	^{78}Se	16-27	RDM	[1987Sc07]	
^{78}Se	0.327(7)				^{16}O, α	^{78}Se	33-34, 6.6-7.3	CE	[1977Le11]	
^{78}Se	0.32(2)				^{16}O, α	^{78}Se	39.2, 6.6-7.3	CE*	[1974Ba80]	Su
^{78}Se	0.35(3)				^{14}N, α	^{78}Se	36, 8.5	CE*	[1962Ga13]	
^{78}Se	0.385(35)				α	^{78}Se	5-8	CE	[1962St02]	
^{78}Se	0.36(6)				^{14}N	^{78}Se	36	CE*	[1960An07]	
^{78}Se	0.36(7)							CE	[1960Le07]	Su
^{78}Se	0.36(5)				α	^{78}Se	7	CE	[1956Te26]	
^{80}Se	0.25(3)				^{80}Se	Pb	40A	CE*	[2005Iw03]	
^{80}Se	0.236 ($^{+28}_{-24}$)				^{48}Ti, ^{16}O; ^{80}Se	^{80}Se; ^{208}Pb	195, 34; 312	CE*	[1995Ka29]	
^{80}Se	0.252(4)				^{16}O, α	^{80}Se	33, 7.3	CE	[1977Le11]	
^{80}Se			12.0(12)		γ	^{80}Se	0.667	GG	[1976KaYY]	NR
^{80}Se	0.25(1)				^{16}O, α	^{80}Se	39.2, 6.6-7.3	CE*	[1974Ba80]	Su
^{80}Se	0.240(30)				α	^{80}Se	5	CE	[1970AgZV]	
^{80}Se	0.283(25)				α	^{80}Se	5-8	CE	[1962St02]	
^{80}Se	0.26(2)				^{14}N, α	^{80}Se	36, 8.5	CE*	[1962Ga13]	
^{80}Se	0.230(46)				^{14}N	^{80}Se	36	CE*	[1960An07]	
^{80}Se	0.230(34)				α	^{80}Se	7	CE	[1956Te26]	
^{82}Se	0.17(3)				^{82}Se	Pb	40A	CE*	[2005Iw03]	
^{82}Se	0.179(19)				^{48}Ti, ^{16}O; ^{82}Se	^{82}Se; ^{208}Pb	195, 34; 312	CE*	[1995Ka29]	
^{82}Se	0.180(3)				^{16}O, α	^{82}Se	33, 7.3	CE	[1977Le11]	
^{82}Se	0.175(9)				^{16}O	^{82}Se	39.2	CE*	[1974Ba80]	Su
^{82}Se	0.170(40)				α	^{82}Se	5	CE	[1970AgZV]	
^{82}Se	0.19(7)				^{14}N, α	^{82}Se	36, 8.5	CE*	[1962Ga13]	
^{82}Se	0.213(19)				α	^{82}Se	5-8	CE	[1962St02]	
^{82}Se	0.190(38)				^{14}N	^{82}Se	36	CE*	[1960An07]	
^{82}Se	0.056(9)				α	^{80}Se	7	CE	[1956Te26]	
^{84}Se	0.105(15)				^{84}Se	^{197}Au	95.4A	CE*	[2010Ga14]	
^{72}Kr			5.6(10)		^{72}Kr	^{9}Be	0.37c	RDM	[2014Iw01]	
^{72}Kr	0.4997(647)				^{72}Kr	^{197}Au	57.4A	CE*	[2005Ga22]	
^{74}Kr			32.2(22)		^{74}Kr	^{9}Be	0.37c	RDM	[2014Iw01]	
^{74}Kr	0.61(1)				^{74}Kr	^{208}Pb	4.4A	CE*	[2007Cl02]	
^{74}Kr			33.8(5)		^{40}Ca	^{40}Ca	147	RDM	[2005Go43]	
^{74}Kr			23.5(20)		^{19}F	^{58}Ni	62	RDM	[1990Ta12]	
^{74}Kr			28.8(57)		^{19}F	^{58}Ni	56-68	RDM	[1984Ro01]	
^{74}Kr			14.0(43)		^{16}O	^{60}Ni	42	RDM	[1976AlYY]	Ex, NR
^{76}Kr	0.72(1)				^{76}Kr	^{208}Pb	4.4A	CE*	[2007Cl02]	
^{76}Kr			41.5(8)		^{40}Ca	^{40}Ca	147	RDM	[2005Go43]	
^{76}Kr			37.7(30)		^{24}Mg	^{58}Ni	80, 85	RDM	[1990He04]	
^{76}Kr			36(1)		^{16}O	^{63}Cu	49-58	RDM	[1984Wo10]	
^{76}Kr			35(3)		^{19}F	^{63}Cu	58	RDM	[1982Ke01]	
^{76}Kr			53(7)		^{16}O	^{62}Ni	42	RDM	[1974No08]	Ex
^{78}Kr	0.5951(481)				^{78}Kr	^{9}Be	150A	CE*	[2009Ob02]	
^{78}Kr	0.670(25)				^{78}Kr	^{26}Mg, ^{48}Ti, ^{208}Pb	180, 200, 350	CE*	[2006Be18]	
^{78}Kr	0.6244(738)				^{72}Kr	^{78}Kr	57.4A	CE*	[2005Ga22]	
^{78}Kr			32.0(14)		^{27}Al	^{58}Ni	115	TDSA	[2002Jo07]	
^{78}Kr			27.5(25)		^{78}Kr	^{26}Mg	220.5	TDSA	[2001Me20]	
^{78}Kr			30.4(13)		^{19}F	^{63}Cu	70	RDM	[1990Ga22]	
^{78}Kr			33(3)		^{12}C	^{68}Zn	36	RDM	[1985Wi01]	
^{78}Kr			32.5(25)		^{12}C, α	^{68}Zn, ^{76}Se	36, 27	TDSA	[1982An06]	Su, NR
^{78}Kr	0.55(3)				α	Kr	6-8	CE	[1981Ca01]	
^{78}Kr			32(2)		^{16}O	^{65}Cu	50, 58	RDM	[1979He07]	
^{78}Kr			36.1(43)		^{16}O	^{64}Ni	42	RDM	[1974No08]	
^{78}Kr	0.51(13)				α	^{78}Kr	6.1, 6.6	CE	[1957He48]	
^{80}Kr			12.1(10)		^{19}F	^{65}Cu	74	TDSA	[2001Mu25]	Ex
^{80}Kr	0.4044(256)				^{80}Kr	^{26}Mg	246.7	TDSA	[2001Me20]	
^{80}Kr	0.39(2)				α	Kr	6-8	CE	[1981Ca01]	
^{80}Kr			12(1)		α, ^{18}O	^{77}Se, ^{65}Cu	13.5, 46	TDSA	[1981Fu03]	
^{80}Kr			12.7(7)		^{18}O	^{65}Cu	52.5	RDM	[1975Fr04]	
^{80}Kr	0.34(9)				α	^{78}Kr	6.1, 6.6	CE	[1957He48]	
^{82}Kr			6.69(20)		^{82}Kr	^{26}Mg	240.7	TDSA	[2001Me20]	
^{82}Kr			6.8(10)		α	^{80}Se	21-27	RDM	[1984Ke10]	NR
^{82}Kr	0.225(9)				^{82}Kr	Al, Zn, Ge	1.41A	CE	[1982Ke01]	
^{82}Kr	0.24(1)				α	Kr	6-8	CE	[1981Ca01]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{82}Kr			6.9(11)		γ	Kr	776	GG	[1966Be16]	
^{82}Kr	0.19(5)				α	^{78}Kr	6.1, 6.6	CE	[1957He48]	
^{84}Kr	0.120(15)				^{84}Kr	^{98}Mo, Ta	250	CE*	[2002Os07]	
^{84}Kr			5.84(18)		^{84}Kr	^{26}Mg	235.0	TDSA	[2001Me20]	
^{84}Kr			5(2)		α	^{82}Se	<27	RDM	[1990Ro10]	NR
^{84}Kr	0.122(5)				^{84}Kr	Al, Zn, Ge	1.41A	CE	[1982Ke01]	
^{84}Kr	0.13(1)				α	Kr	6-8	CE	[1981Ca01]	
^{84}Kr	0.16(4)				α	^{78}Kr	6.1, 6.6	CE	[1957He48]	
^{86}Kr			0.444(25)		^{86}Kr	^{26}Mg	261.1	TDSA	[2001Me20]	
^{86}Kr	0.11(3)				α	Kr	6-8	CE	[1981Ca01]	
^{86}Kr	0.128(10)				^{16}O	^{86}Kr	42-52	CE*	[1981Ji03]	
^{88}Kr		7.7(8)			^{88}Kr	^{12}C	2.19A	CE	[2009MuZU]	
^{88}Kr		~8.0			^{88}Kr	^{12}C		CE	[2009MuZW]	Su
^{90}Kr			15(10)		n	^{235}U	cold	TMC	[2014Re15]	
^{92}Kr		$13.6(^{+28}_{-33})$			^{92}Kr	^{196}Pt	262.2	CE	[2013Al05]	
^{92}Kr		16.9(5)			^{92}Kr	^{109}Ag	2.19A	CE	[2009MuZU]	
^{92}Kr		~17.0			^{92}Kr	^{109}Ag		CE	[2009MuZW]	Su
^{94}Kr	0.247(28)				^{94}Kr	^{196}Pt	267.9	CE	[2012Al03]	
^{96}Kr	0.436(93)				^{96}Kr	^{194,196}Pt	273.6	CE	[2012Al03]	
^{76}Sr			296(36)		^{76}Rb	^{9}Be	104.5A	DSA	[2012Le05]	
^{78}Sr			276(39)		^{78}Rb	^{9}Be	101.6A	DSA	[2012Le05]	
^{78}Sr			224(27)		^{24}Mg	^{58}Ni	100	RDM	[1982Li08]	
^{80}Sr			49.4(18)		^{24}Mg	^{58}Ni	80, 85	RDM	[1990He04]	
^{80}Sr			58(10)		^{66}Zn, ^{78}Kr	^{16}O, α	55, 28	RDM	[1982HiZT]	
^{80}Sr			53.4(43)		^{24}Mg	^{58}Ni	100	RDM	[1982Li08]	
^{80}Sr			63(9)		^{16}O	^{66}Zn	42	RDM	[1974No08]	
^{82}Sr			15.4(31)		^{27}Al	^{58}Ni	90	RDM	[1996Jo05]	
^{82}Sr			44(15)			^{82}Y(β^+)		DC	[1982De36]	Ex, NR
^{82}Sr			12.8(5)		^{19}F	^{66}Zn	65	RDM	[1981DeYW]	
^{84}Sr			4.2(2)		^{84}Sr	^{12}C	275	DSAM	[2012Ku14]	
^{84}Sr			9(3)		^{12}C	^{76}Ge	60	RDM	[1994Ch28]	Ex, NR
^{84}Sr			4.6(5)		^{12}C	^{76}Ge	60	RDM	[1982De05]	
^{84}Sr			$6(^{+4}_{-2})$		α	^{82}Kr	14, 18	TDSA	[1980Ek03]	
^{84}Sr	0.16(5)				N	^{84}Sr	44	CE*	[1963Al31]	
^{86}Sr			2.0(1)		^{86}Sr	^{12}C	250	DSA	[2012Ku14]	
^{86}Sr	0.121(5)				e	^{86}Sr	100-370	EE	[1992Ki20]	
^{86}Sr			2.10(22)		^{28}Si	^{86}Sr	88	TDSA	[1988Ku01]	
^{86}Sr	0.118(16)				^{16}O	^{86}Sr	35-42	CE	[1964Sy01]	
^{86}Sr	0.087(26)				N	^{86}Sr	44	CE*	[1963Al31]	
^{88}Sr			0.219(18)		^{88}Sr	^{12}C	270	DSA	[2012Ku14]	
^{88}Sr			0.214(11)		n	^{88}Sr	fast	TDSA	[2008Go25]	
^{88}Sr			0.219(23)		^{28}Si	^{88}Sr	88	TDSA	[1988Ku01]	
^{88}Sr			0.224(11)		γ	^{88}Sr	2.0-2.31	GG	[1977Me10]	
^{88}Sr	0.0822(24)				e	^{88}Sr	45-121	EE	[1974Fi05]	
^{88}Sr	0.114(15)				^{16}O	^{88}Sr	45-60	CE*	[1973Ch13]	
^{88}Sr	0.099(5)				e	^{88}Sr	65,70	EE	[1968Pe02]	
^{88}Sr	0.092(17)				^{16}O	^{88}Sr	35-42	CE	[1964Sy01]	
^{88}Sr			0.155(40)		γ	^{88}Sr		GG	[1959Of14]	
^{88}Sr	0.140(10)				e	^{88}Sr	187	EE	[1956He83]	
^{90}Sr			10(3)					DC	[1991Ma05]	
^{92}Sr			12(5)					DC	[1991Ma05]	
^{94}Sr			10(4)					DC	[1991Ma05]	
^{96}Sr	0.2310(55)				^{96}Sr	^{109}Ag, ^{120}Sn	~4.5A	CE*	[2011Cl03]	
^{96}Sr			7(4)					DC	[1991Ma05]	
^{98}Sr			4040(110)					DC	[1989Ma38]	
^{98}Sr			3952(173)					DC	[1987Oh05]	
^{98}Sr			5800(1400)					DC	[1980Sc13]	
^{98}Sr			4700(2200)					DC	[1980ChZM]	
^{98}Sr			5200(600)					DC	[1979Az01]	
^{100}Sr			5640(230)					DC	[1990Lh01]	
^{100}Sr			7430(290)					DC	[1979Az01]	
^{82}Zr			32(13)		^{27}Al	^{58}Ni	92	RDM	[1997Pa07]	
^{82}Zr			40(4)		^{28}Si	^{58}Ni	120-125	RDM	[1993Ch41]	
^{84}Zr			24(2)		^{28}Si	^{59}Co	98	RDM	[1996Ch02]	NR
^{84}Zr			20.3(11)		^{28}Si, ^{29}Si	^{58}Ni	95-110	RDM	[1983Pr08]	
^{86}Zr			11.2(28)		^{32}S	^{58}Ni	130	RDM	[1998Ka19]	NR
^{86}Zr			10.6(20)		^{16}O	73Ge	52.0	RDM	[1978Av02]	
^{88}Zr			3.6(4)		^{88}Sr	^{12}C	275	DSA	[2012Ku14]	
^{88}Zr			1.33(43)		p	^{90}Zr	7	TDSA	[1973BeYD]	Ex
^{90}Zr			$0.125(^{+7}_{-6})$		n	^{90}Zr	2.5	DSAM	[2013Pe16]	
^{90}Zr			0.121(20)		p	^{89}Y	4	TDSA	[1993Sa38]	
^{90}Zr	0.0517(88)				n	^{90}Zr	8, 10, 24	SCATT	[1990Wa13]	NR
^{90}Zr	0.0653(21)				e	^{90}Zr	70-368	EE	[1984He02]	NR
^{90}Zr	0.067(6)				e	^{90}Zr	53.75-112.2	EE	[1975Si21]	
^{90}Zr	0.060(6)				e	^{90}Zr	50-100	EE	[1975DeXW]	
^{90}Zr	0.067(6)				e	^{90}Zr	45-250	EE	[1974Si01]	Su
^{90}Zr			0.135(8)		γ	^{90}Zr	<5.6	GG	[1974Me13]	
^{90}Zr			0.075(21)		p	^{90}Zr	7	TDSA	[1973BeYD]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{90}Zr			0.080(10)					TDSA	[1973RaWV]	
^{90}Zr			0.135(8)		γ	^{90}Zr	2.186	GG	[1972Me04]	Su
^{90}Zr	0.0400(30)				e	^{90}Zr		EE	[1971MiZK]	
^{90}Zr	0.0830(19)				e	^{90}Zr	60	EE	[1970Be07]	
^{90}Zr	0.042(15)				^{14}N	^{90}Zr	44	CE	[1965Ga05]	
^{92}Zr	0.0762(28)				e	^{92}Zr	63	EE	[2013Sc01]	
^{92}Zr		6.4(6)	7.25(68)		γ	^{92}Zr	<4.3	GG	[2002We15]	
^{92}Zr	0.120(25)				n	^{92}Zr	8, 10, 24	SCATT	[1990Wa13]	NR
^{92}Zr	0.080(6)				^{16}O	^{92}Zr	46	CE*	[1981Yo07]	
^{92}Zr	0.079(20)				^{12}C, ^{14}N, α	^{92}Zr	31-46, 12	CE*	[1969Ga25]	
^{92}Zr	0.094(19)				N	^{92}Zr	44	CE*	[1963Al31]	
^{92}Zr	0.079(8)				α	^{92}Zr	9	CE	[1958St32]	
^{94}Zr			10.47(61)		^{32}S	^{94}Zr	105	RDM	[1993Ho12]	NR
^{94}Zr	0.110(16)				n	^{94}Zr	8, 10, 24	SCATT	[1990Wa13]	NR
^{94}Zr	0.056(14)				^{12}C, ^{14}N; α	^{94}Zr	31-46; 12	CE	[1969Ga25]	
^{94}Zr	0.081(17)				N	^{94}Zr	44	CE*	[1963Al31]	
^{94}Zr	0.079(8)				α	^{94}Zr	9	CE	[1958St32]	
^{96}Zr			$0.77(^{+18}_{-13})$		n	^{96}Zr	2.0	DSAM	[2013Pe16]	
^{96}Zr			0.82(10)		^{96}Zr	^{12}C	274	TDSA	[2003Ku11]	
^{96}Zr	0.055(22)				^{14}N	^{96}Zr	44	CE*	[1965Ga05]	
^{98}Zr			<16					DC	[2010Be30]	
^{98}Zr			<30					DC	[1989Ma38]	
^{100}Zr			928(75)			^{252}Cf(SF)		RDM	[2002Sm10]	Ex
^{100}Zr			780(60)					DC	[1989Oh06]	
^{100}Zr			793(29)					DC	[1989Ma47]	
^{100}Zr			580(120)					DC	[1989Lh01]	
^{100}Zr			286(46)					RDM	[1983MaYT]	
^{100}Zr			890(140)					DC	[1980ChZM]	
^{100}Zr			1030(43)					DC	[1975JaYL,1974JaZN]	NR
^{100}Zr			4040(1300)					DC	[1972ClZN]	Ex, NR
^{100}Zr			750(160)					DC	[1970Ch11]	
^{100}Zr			10100(2900)					DC	[1970Jo20]	Ex, NR
^{102}Zr			3610(430)					DC	[2015Br03]	
^{102}Zr			4300					DC	[2005Fo17]	Ex
^{102}Zr			2470(200)					DC	[1980ChZM]	
^{102}Zr			3190(250)					DC	[1975JaYL,1974JaZN]	NR
^{102}Zr			1240(250)					DC	[1970Ch11]	Su
^{102}Zr			2500(600)					DC	[1970Wa05]	
^{104}Zr			$2900(^{+250}_{-200})$			^{106}Y(β^-)		DC	[2015Br13]	
^{104}Zr			2885(435)					DC	[2006Hw01]	
^{104}Zr			3300					DC	[2005Fo17]	Su
^{106}Zr			$2600(^{+200}_{-150})$			^{106}Y(β^-)		DC	[2015Br13]	
^{92}Mo	0.109(5)				e	^{92}Mo	100-380	EE	[1987MiZL]	NR
^{92}Mo			0.582(36)		γ	^{92}Mo	2.0-5.1	GG	[1977Me01]	
^{92}Mo			0.55(10)		p	^{92}Mo	7, 8, 8.8	TDSA	[1973DoZB]	
^{92}Mo			$0.43(^{+22}_{-14})$		α	^{92}Mo	25	TDSA	[1971Yo02]	
^{92}Mo	0.107(6)				α	^{92}Mo	8	CE	[1971WaZP]	Rad
^{92}Mo	0.093(14)				^{16}O	^{92}Mo	38-49	CE	[1964St04]	
^{92}Mo	0.19(8)				^{14}N	^{92}Mo	40	CE*	[1962Af02]	
^{94}Mo			4.15(6)					TDSA	[2002Kl07]	Ex
^{94}Mo	0.1960(30)				^{16}O, α	^{94}Mo	36, 8	CE	[1976Pa13]	
^{94}Mo			4.30(20)		^{35}Cl	^{94}Mo	100	TDSA	[1972SiZP]	
^{94}Mo	0.218(11)				^{16}O	^{94}Mo	35-44.8	CE	[1971Ba59]	NR
^{94}Mo			4.00(20)		^{35}Cl	^{94}Mo	100	TDSA	[1971SiYA]	Su
^{94}Mo	0.208(12)				α	^{94}Mo	8	CE	[1971WaZP]	Rad
^{94}Mo			2.0(5)		γ	^{94}Mo		GG	[1966Be53]	
^{94}Mo	0.270(35)				^{14}N	^{94}Mo	41	CE*	[1962Ga13]	
^{94}Mo	0.230(40)				^{14}N	^{94}Mo	36	CE	[1962Er05]	
^{94}Mo	0.265(21)				α	^{94}Mo	2.4, 2.7, 3.0	CE	[1958St32]	
^{94}Mo	0.290(44)				α	^{94}Mo	7	CE	[1956Te26]	
^{96}Mo	0.2700(40)				^{16}O, α	^{96}Mo	36, 8	CE	[1976Pa13]	
^{96}Mo			5.00(20)		^{35}Cl	^{96}Mo	100	TDSA	[1972SiZP]	
^{96}Mo	0.284(14)				^{16}O	^{96}Mo	35-44.8	CE	[1971Ba59]	NR
^{96}Mo	0.288(16)						8	CE	[1971WaZP]	
^{96}Mo			5.60(20)		^{35}Cl	^{96}Mo	100	TDSA	[1971SiYA]	Su
^{96}Mo	0.302(39)				^{14}N	^{96}Mo	41	CE*	[1962Ga13]	
^{96}Mo	0.240(40)				^{14}N	^{96}Mo	36	CE	[1962Er05]	
^{96}Mo	0.302(22)				α	^{96}Mo	2.4, 2.7, 3.0	CE	[1958St32]	
^{96}Mo	0.310(47)				α	^{96}Mo	7	CE	[1956Te26]	
^{98}Mo	0.277(8)				^{20}Ne, ^{84}Kr, ^{136}Xe	^{98}Mo	50, 250, 614	CE*	[2002Zi06]	Ex, Gos
^{98}Mo	0.2670(40)				α, ^{16}O	^{98}Mo	8, 36.5	CE	[1979Pa11]	
^{98}Mo	0.2660(50)				^{16}O, α	^{98}Mo	36, 8	CE	[1976Pa13]	Su
^{98}Mo			5.20(20)		^{35}Cl	^{98}Mo	100	TDSA	[1972SiZP]	
^{98}Mo	0.286(14)				^{16}O	^{98}Mo	35-44.8	CE	[1971Ba59]	NR
^{98}Mo	0.275(15)						8	CE	[1971WaZP]	
^{98}Mo	0.270(32)				^{14}N	^{98}Mo	41	CE*	[1962Ga13]	
^{98}Mo	0.260(40)				^{14}N	^{98}Mo	36	CE	[1962Er05]	
^{98}Mo	0.268(23)				α	^{98}Mo	2.4, 2.7, 3.0	CE	[1958St32]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{98}Mo	0.270(40)				α	^{98}Mo	7	CE	[1956Te26]	
^{100}Mo	0.511(9)				^{16}O, α	^{100}Mo	36, 8	CE	[1976Pa13]	
^{100}Mo			19.6(10)		^{18}O	^{100}Mo	20-61	RDM	[1975Bo39]	
^{100}Mo	0.526(26)				^{16}O	^{100}Mo	35-44.8	CE	[1971Ba59]	NR
^{100}Mo	0.61(6)				^{14}N	^{100}Mo	41	CE*	[1962Ga13]	
^{100}Mo	0.63(10)				^{14}N	^{100}Mo	36	CE	[1962Er05]	
^{100}Mo	0.613(32)				α	^{100}Mo	2.4, 2.7, 3.0	CE	[1958St32]	
^{100}Mo	0.66(10)				α	^{100}Mo	7	CE	[1956Te26]	
^{102}Mo			180(6)					DC	[1991Li39]	
^{102}Mo			164(19)		^{18}O	^{100}Mo	20-61	RDM	[1975Bo39]	
^{104}Mo			1396(112)			^{252}Cf(SF)		RDM	[2002Sm10]	Ex
^{104}Mo			1040(60)					DC	[1991Li39]	
^{104}Mo			1270(140)					DC	[1980ChZM]	
^{104}Mo			1314(43)					DC	[1975JaYL,1974JaZN]	NR
^{104}Mo			650(130)					DC	[1970Ch11]	
^{104}Mo			1200(200)					DC	[1970Wa05]	NR
^{106}Mo			1876(289)					DC	[2015Br03]	
^{106}Mo			1730(140)					DC	[2006Hw01]	
^{106}Mo			540(80)					RDM	[1983MaYT]	
^{106}Mo			1930(140)					DC	[1980ChZM]	
^{106}Mo			1803(43)					DC	[1975JaYL,1974JaZN]	NR
^{106}Mo			1080(220)					DC	[1970Ch11]	
^{108}Mo			851(317)					DC	[2015Br03]	
^{108}Mo			940(270)					DC	[1998LhZZ]	
^{108}Mo			720(430)					DC	[1996Pe25]	
^{96}Ru			4.5(2)		^{96}Ru	^{12}C	333	DSA	[2012To01]	
^{96}Ru			4.3(1)			^{96}Rh(β^+)		TDSA	[2002Kl07]	
^{96}Ru			5.1(5)		^{36}S	^{65}Cu	142	CE*	[2000Kh02]	NR
^{96}Ru	0.236(7)				α, ^{16}O	^{96}Ru	8.5-9.5, 36-48	CE	[1980La01]	
^{96}Ru	0.266(26)				^{16}O	^{96}Ru	44.8	CE	[1980La01]	
^{96}Ru	0.260(10)				^{16}O	^{96}Ru	37-48	CE	[1978Fa08]	
^{96}Ru	0.268(32)				^{16}O, α	^{96}Ru	42-49, 10	CE	[1968Mc08]	
^{96}Ru	0.254(41)				p, α	^{96}Ru	1.5-3.3, 8-10	CE	[1958St32]	
^{98}Ru			8.36(29)		^{98}Ru	^{24}Mg	300	RDM	[2012Ra03]	
^{98}Ru			8.0(12)		36	65	142	RDM/ TDSA	[2000Kh02]	NR
^{98}Ru	0.389(31)				^{16}O	^{98}Ru	44.8	CE	[1980La01]	
^{98}Ru	0.373(7)				α, ^{16}O	^{98}Ru	8.5-9.5, 36-48	CE	[1980La01]	
^{98}Ru	0.411(35)				^{16}O, α	^{98}Ru	42-49, 10	CE	[1968Mc08]	
^{98}Ru	0.475(38)				p, α	^{98}Ru	1.5-3.3, 8-10	CE	[1958St32]	
^{100}Ru	0.4930(40)				α, ^{16}O	^{100}Ru	7.7-9, 35-39	CE	[1998Hi01]	
^{100}Ru	0.471(14)				α	^{100}Ru	9-17	CE*	[1996Go36]	
^{100}Ru	0.494(6)				α, ^{16}O	^{100}Ru	8.5-9.5, 36-48	CE	[1980La01]	
^{100}Ru	0.482(26)				^{16}O	^{100}Ru	44.8	CE	[1980La01]	
^{100}Ru	0.4930(30)				α, ^{16}O	^{100}Ru	8-9, 35-37	CE	[1980HiZV]	
^{100}Ru	0.520(44)				^{16}O, α	^{100}Ru	42-49, 10	CE	[1968Mc08]	
^{100}Ru	0.572(40)				p, α	^{100}Ru	1.5-3.3, 8-10	CE	[1958St32]	
^{100}Ru	0.30(6)				α	^{100}Ru	7	CE	[1956Te26]	
^{102}Ru	0.614(5)				α, ^{16}O	^{102}Ru	7.7-9, 35-39	CE	[1998Hi01]	
^{102}Ru	0.585(16)				α	^{102}Ru	9-17	CE	[1996Go36]	
^{102}Ru			26.40(10)		a	^{100}Mo	17-27	TDSA	[1995Ef01]	
^{102}Ru			26.0(14)		^{40}Ar	^{102}Ru	129	RDM	[1989Lo08]	
^{102}Ru	0.640(6)				α, ^{16}O	^{102}Ru	8.5-9.5, 36-48	CE	[1980La01]	
^{102}Ru	0.651(35)				^{16}O	^{102}Ru	44.8	CE	[1980La01]	
^{102}Ru	0.617(5)				α, ^{16}O	^{102}Ru	8.5,9.0, 38-42	CE	[1979Bo28]	
^{102}Ru	0.66(6)				^{16}O, α	^{102}Ru	42-49, 10	CE	[1968Mc08]	
^{102}Ru			17.6(29)		d	Ru		DC	[1963De21]	
^{102}Ru	0.73(5)				p, α	^{102}Ru	1.5-3.3, 8-10	CE	[1958St32]	
^{102}Ru	0.63(10)				α	^{102}Ru	7	CE	[1956Te26]	
^{104}Ru	0.840(45)				^{208}Pb, ^{136}Xe, ^{58}Ni	^{104}Ru	954, 525, 165, 190	CE*	[2006Sr01]	
^{104}Ru	0.807(8)				α, ^{16}O	^{104}Ru	7.7-9, 35-39	CE	[1998Hi01]	
^{104}Ru	0.778(24)				α	^{104}Ru	9-17	CE	[1996Go36]	
^{104}Ru	0.834(7)				α, ^{16}O	^{104}Ru	8.5-9.5, 36-48	CE	[1980La01]	
^{104}Ru	0.834(44)				^{16}O	^{104}Ru	44.8	CE	[1980La01]	
^{104}Ru	0.82(6)				^{16}O, α	^{104}Ru	42-49, 10	CE	[1968Mc08]	
^{104}Ru	0.93(7)				p, α	^{104}Ru	1.5-3.3, 8-10	CE	[1958St32]	
^{104}Ru	1.04(16)				α	^{104}Ru	7	CE	[1956Te26]	
^{106}Ru			249(5)			^{106}Tc(β^+)		Time-Delayed	[2008Sa05]	
^{106}Ru			380(100)		n	^{249}Cf	thermal	DC	[1995Sc24]	
^{108}Ru			590(100)		n	^{249}Cf	thermal	DC	[1995Sc24]	
^{108}Ru			498(43)					DC	[1975JaYL,1974JaZN]	NR
^{108}Ru			320(70)			^{252}Cf(SF)		DC	[1970Ch11]	
^{110}Ru			720(120)		n	^{249}Cf	thermal	DC	[1995Sc24]	
^{110}Ru			433(29)			^{254}Cf		DC	[1980ChZM]	
^{110}Ru			490(60)					DC	[1975JaYL,1974JaZN]	Su, NR
^{110}Ru			330(70)			^{252}Cf(SF)		DC	[1970Ch11]	
^{112}Ru			690(90)			^{254}Cf		DC	[1980ChZM]	
^{112}Ru			462(43)					DC	[1975JaYL,1974JaZN]	Su, NR
^{112}Ru			290(60)			^{252}Cf(SF)		DC	[1970Ch11]	
^{98}Pd			<16.3		^{10}B, ^{3}He	^{92}Mo, ^{96}Ru	54, 12.5	RDM	[2009FrZZ]	

(*continued on next page*)

Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{100}Pd			13.3(9)		^{80}Se	^{24}Mg	268	RDM	[2011An04,2012An17]	Ex
^{100}Pd			9.0(4)		^{11}B	^{92}Mo	43	RDM	[2009Ra28]	
^{102}Pd	0.460(30)				^{16}O	^{102}Pd	44	CE	[1980LuZT]	
^{102}Pd	0.460(30)				p	^{102}Pd	8	CE*	[1977La16]	
^{104}Pd	0.540(30)				e	^{104}Pd	70-440	EE	[1991We15]	
^{104}Pd	0.510(30)				^{16}O	^{104}Pd	44	CE	[1980LuZT]	
^{104}Pd	0.531(40)				α	^{104}Pd	8	CE	[1971Bo08]	
^{104}Pd	0.51(5)				α, ^{16}O	^{104}Pd	8.5-10, 30-42	CE	[1970Ch01]	
^{104}Pd	0.55(5)				α, ^{16}O	^{104}Pd	2.1,2.4,2.7, 45.5,49.0	CE	[1968MiZZ]	
^{104}Pd	0.61(9)				^{14}N	^{104}Pd	36	CE	[1962Er05]	
^{104}Pd	0.547(38)				p, α	^{104}Pd	1.5-3.3, 8-10	CE	[1958St32]	
^{104}Pd	0.46(7)				a	^{104}Pd	<7	CE	[1956Te26]	
^{106}Pd		42(4)			^{16}O, ^{58}Ni, ^{208}Pb	^{106}Pd	48, 165.5, 878	CE*	[1995Sv01]	
^{106}Pd	0.590(20)				e	^{106}Pd	70-440	EE	[1991We15]	
^{106}Pd			17.8(11)		^{40}Ar	^{106}Pd	129	RDM	[1989Lo08]	
^{106}Pd	0.66(21)				γ	^{106}Pd	0.511	GG	[1977Ga06]	
^{106}Pd	0.74(8)				e	^{106}Pd	183,250	EE	[1973Ho05]	
^{106}Pd	0.689(37)				α	^{106}Pd	8	CE	[1971Bo08]	
^{106}Pd	0.61(6)				α, ^{16}O	^{106}Pd	8.5-10, 30-42	CE	[1970Ch01]	
^{106}Pd	0.710(40)				α, ^{16}O	^{106}Pd	9-10, 42-49	CE	[1969Ro05]	
^{106}Pd	0.61(9)				^{14}N	^{106}Pd	36	CE	[1962Er05]	
^{106}Pd	0.646(45)				p, α	^{106}Pd	1.5-3.3, 8-10	CE	[1958St32]	
^{106}Pd	0.59(9)				α	^{106}Pd	<7	CE	[1956Te26]	
^{108}Pd	0.76(9)	$50(^{+7}_{-5})$			^{16}O, ^{58}Ni, ^{208}Pb	^{108}Pd	48, 165.5, 878	CE*	[1995Sv01]	
^{108}Pd	0.810(30)				e	^{108}Pd	70-440	EE	[1991We15]	
^{108}Pd			34.1(18)		^{40}Ar	^{108}Pd	129	RDM	[1989Lo08]	
^{108}Pd	0.805(29)				e	^{108}Pd	21-121	EE	[1978Ar07]	NR
^{108}Pd	0.70(7)				α, ^{16}O	^{108}Pd	7-10, 28-42	CE	[1971Ha08]	
^{108}Pd	0.792(50)				α	^{108}Pd	8	CE	[1971Bo08]	
^{108}Pd	0.76(5)				α, ^{16}O	^{108}Pd	9-10, 42-49	CE	[1969Ro05]	
^{108}Pd	0.78(6)				^{16}O	^{108}Pd	40	CE	[1962Ec01]	
^{108}Pd	0.82(12)				^{14}N	^{108}Pd	36	CE	[1962Er05]	
^{108}Pd	0.74(5)				p, α	^{108}Pd	1.5-3.3, 8-10	CE	[1958St32]	
^{108}Pd	0.78(12)				α	^{108}Pd	<7	CE	[1956Te26]	
^{110}Pd			67(8)		^{110}Pd	^{9}Be	66A	RDM/ TDSA	[2008De30]	
^{110}Pd	0.870(30)				e	^{110}Pd	70-440	EE	[1991We15]	
^{110}Pd			65.6(25)		^{58}Ni	^{110}Pd	190	RDM	[1989Ko40]	
^{110}Pd	$0.85(^{+2}_{-7})$				^{16}O, ^{58}Ni, ^{208}Pb	^{110}Pd	48, 165.5, 954	CE*	[1989SvZZ]	Su, Gos, NR
^{110}Pd	0.80(7)				e	^{110}Pd	40-110	EE	[1976Li19]	
^{110}Pd	0.82(8)				α, ^{16}O	^{110}Pd	7-10, 28-42	CE	[1971Ha08]	
^{110}Pd	0.88(6)				α	^{110}Pd	8	CE	[1971Bo08]	
^{110}Pd	0.91(6)				α, ^{16}O	^{110}Pd	9-10, 42-49	CE	[1969Ro05]	
^{110}Pd	0.78(12)				^{14}N	^{110}Pd	36	CE	[1962Er05]	
^{110}Pd	0.91(7)				^{16}O	^{110}Pd	40	CE	[1962Ec01]	
^{110}Pd	0.86(6)				p, α	^{110}Pd	1.5-3.3, 8-10	CE	[1958St32]	
^{110}Pd	1.04(16)				α	^{110}Pd	<7	CE	[1956Te26]	
^{112}Pd			121(20)			^{252}Cf(SF)		RDM	[1986Ma22]	
^{114}Pd			118(20)		^{114}Pd	^{9}Be	69A	RDM/ TDSA	[2008De30]	
^{114}Pd			500(100)			^{252}Cf(SF)		RDM	[1986Ma22]	
^{114}Pd			290(90)					DC	[1975JaYL,1974JaZN]	Su, NR
^{116}Pd			153(43)					DC	[1975JaYL,1974JaZN]	NR
^{100}Cd	0.33(2)				^{100}Cd	^{109}Ag	287	CE*	[2009Ek01]	
^{102}Cd	0.28(3)				^{102}Cd	^{109}Ag	292.7	CE*	[2009Ek01]	
^{102}Cd			5.9(5)		^{12}C	^{92}Mo	41	RDDS	[2007Bo17]	
^{102}Cd			<8.1		^{50}Cr	^{58}Ni	205	RDM/ TDSA	[2001Li24]	
^{104}Cd	0.28(4)				^{104}Cd	^{109}Ag	298.7	CE*	[2009Ek01]	
^{104}Cd			8.5(12)		^{12}C	^{94}Mo	44	RDDS	[2007Bo17]	
^{104}Cd			9.0(37)		^{50}Cr	^{58}Ni	200,205	TDSA	[2001Mu19]	
^{104}Cd			8.8(25)		^{12}C	^{95}Mo	48	RDM	[1989VoZT]	
^{106}Cd	0.384(5)				α, ^{16}O	^{106}Cd	8-17, 40-44	CE	[1976Es02]	
^{106}Cd	0.403(29)				α, ^{16}O, ^{32}S	^{106}Cd	9, 35-40, 49-55	CE	[1970Kl12]	
^{106}Cd	0.426(17)				p, α, ^{16}O	^{106}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{106}Cd	0.47(5)				p, α	^{106}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{108}Cd			10.1(8)		^{12}C	^{100}Mo	54	RDM	[1994Th01]	
^{108}Cd	0.406(5)				α, ^{16}O	^{108}Cd	8-17, 40-44	CE	[1976Es02]	
^{108}Cd	0.442(18)				p, α, ^{16}O	^{108}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{108}Cd	0.54(11)				p, α	^{108}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{110}Cd			8.7(12)		^{13}C	^{100}Mo	50	TDSA	[2001Ha09]	
^{110}Cd			9.2(6)		^{13}C	^{100}Mo	44	RDM	[1993Pi16]	
^{110}Cd	0.447(35)				e	^{110}Cd	70-440	EE	[1991We15]	
^{110}Cd	0.415(6)				p	^{110}Cd	2.7-4.2	CE	[1985Si01]	
^{110}Cd	0.454(43)				e	^{110}Cd	68,112	EE	[1977Gi13]	
^{110}Cd	0.426(5)				α, ^{16}O	^{110}Cd	8-17, 40-44	CE	[1976Es02]	
^{110}Cd	0.432(6)				α, ^{16}O	^{110}Cd	8-16, 36-45	CE	[1972Be66]	
^{110}Cd	0.440(40)				α, ^{16}O	^{110}Cd	7-10, 28-42	CE	[1971Ha08]	
^{110}Cd	0.436(22)				α, ^{16}O, ^{32}S, ^{40}Ar	^{110}Cd	9-10, 38-40, 64, 101	CE	[1970St17]	
^{110}Cd	0.467(19)				p, α, ^{16}O	^{110}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{110}Cd	0.459(54)				^{16}O	^{110}Cd	42-49	CE	[1965Mc05]	NR

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{110}Cd	0.504(40)				p, α	^{110}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{110}Cd	0.42(8)				p	^{110}Cd	<7	CE	[1958Sh01]	
^{110}Cd	0.41(6)				α	^{110}Cd	<7	CE	[1956Te26]	
^{112}Cd	0.486(5)				p	^{112}Cd	2.7-4.2	CE	[1985Si01]	
^{112}Cd	0.52(5)				e	^{112}Cd	68,112	EE	[1977Gi13]	
^{112}Cd	0.483(5)				α, ^{16}O	^{112}Cd	8-17, 40-44	CE	[1976Es02]	
^{112}Cd	0.486(8)				α	^{112}Cd	8-17	CE	[1973WeYO]	
^{112}Cd			10.20(40)		^{35}Cl	^{112}Cd	100	TDSA	[1972SiZP]	
^{112}Cd	0.520(20)				^{32}S	^{112}Cd	90,100	CE*	[1971Ha47]	
^{112}Cd			8.30(40)					RDM	[1971NoZT]	
^{112}Cd	0.478(33)				α, ^{16}O, ^{32}S, ^{40}Ar	^{112}Cd	9-10, 38-40, 64, 101	CE	[1970St17]	
^{112}Cd	0.524(21)				p, α, ^{16}O	^{112}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{112}Cd	0.514(60)				^{16}O	^{112}Cd	42-49	CE	[1965Mc05]	NR
^{112}Cd	0.546(38)				^{16}O	^{112}Cd	45	CE	[1962Ec03]	
^{112}Cd	0.542(38)				p, α	^{112}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{112}Cd	0.42(8)				p	^{112}Cd	<7	CE	[1958Sh01]	
^{112}Cd	0.46(7)				α	^{112}Cd	<7	CE	[1956Te26]	
^{114}Cd	0.510(30)				^{16}O, ^{40}Ca, ^{58}Ni, ^{208}Pb	^{114}Cd	45,122, 184,916	CE*	[1988Fa07]	
^{114}Cd	0.574(18)				p	^{114}Cd	2.7-4.2	CE	[1985Si01]	
^{114}Cd	0.48(1)				α	^{114}Cd	21	CE*	[1979Sa05]	Ex, MD, NR
^{114}Cd	0.517(49)				e	^{114}Cd	68,112	EE	[1977Gi13]	
^{114}Cd	0.528(5)				α, ^{16}O	^{114}Cd	8-17, 40-44	CE	[1976Es02]	
^{114}Cd	0.575(48)				e	^{114}Cd	40-110	EE	[1976Li19]	
^{114}Cd	0.553(18)				e	^{114}Cd	30-60	EE	[1974Ye01]	
^{114}Cd	0.47(5)				e	^{114}Cd	183,250	EE	[1973Ho05]	
^{114}Cd	0.512(6)				α, ^{16}O	^{114}Cd	8-16, 36-45	CE	[1972Be66]	
^{114}Cd	0.547(13)				α	^{114}Cd	8-18	CE	[1970Wa04]	
^{114}Cd	0.553(14)				α	^{114}Cd	8-16	CE	[1970Pr07]	
^{114}Cd	0.502(31)				α, ^{16}O, ^{32}S	^{114}Cd	9, 35-40, 49-55	CE	[1970Kl12]	
^{114}Cd	0.560(17)				^{16}O, α	^{114}Cd	42, 8-13	CE	[1969Sa27]	
^{114}Cd	0.576(23)				p, α, ^{16}O	^{114}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{114}Cd	0.508(9)				α, ^{16}O	^{114}Cd	8.5-10, 36.2	CE	[1968Si05]	
^{114}Cd	0.503(13)				α, ^{12}C, ^{16}O	^{114}Cd	2-3A	CE	[1967St03]	
^{114}Cd	0.48(5)				^{16}O, ^{32}S	^{114}Cd	19-27, 41-54	CE	[1967Si03]	
^{114}Cd	0.572(18)				^{16}O	^{114}Cd	42	CE	[1967Gl02]	
^{114}Cd	0.571(67)				^{16}O	^{114}Cd	42-49	CE	[1965Mc05]	NR
^{114}Cd			15.3(55)		γ	^{114}Cd		GG	[1962Ak01]	NR
^{114}Cd	0.523(37)				^{16}O	^{114}Cd	45	CE	[1962Ec03]	
^{114}Cd	0.584(41)				p, α	^{114}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{114}Cd	0.52(10)				p	^{114}Cd	<7	CE	[1958Sh01]	
^{114}Cd	0.55(8)				a	^{114}Cd	<7	CE	[1956Te26]	
^{116}Cd	0.608(30)				p	^{116}Cd	2.7-4.2	CE	[1985Si01]	
^{116}Cd	0.501(47)				e	^{116}Cd	68,112	EE	[1977Gi13]	
^{116}Cd	0.532(5)				α, ^{16}O	^{116}Cd	8-17, 40-44	CE	[1976Es02]	
^{116}Cd	0.533(8)				α	^{116}Cd	8-17	CE	[1973WeYO]	
^{116}Cd	0.653(35)				α, ^{16}O, ^{32}S, ^{40}Ar	^{116}Cd	9-10, 38-40, 64, 101	CE	[1970St17]	
^{116}Cd	0.581(23)				p, α, ^{16}O	^{116}Cd	2.7,3.0, 9-11, 42-49	CE	[1969Mi07]	
^{116}Cd	0.62(5)				α, ^{12}C, ^{16}O	^{116}Cd	2-3A	CE	[1967St03]	
^{116}Cd	0.580(68)				^{16}O	^{116}Cd	42-49	CE	[1965Mc05]	NR
^{116}Cd	0.68(14)				p	^{116}Cd	<7	CE	[1958Sh01]	
^{116}Cd	0.600(42)				p, α	^{116}Cd	1.5-3.3, 8-10	CE	[1958St32]	
^{116}Cd	0.62(9)				α	^{116}Cd	<7	CE	[1956Te26]	
^{118}Cd	0.578(44)					^{118}Ag(β^-)		DC	[1989Ma33]	
^{120}Cd	0.473(55)					^{120}Ag(β^-)		DC	[1989Ma33]	
^{122}Cd	0.41(20)				^{122}Cd	^{108}Pd	347.7	CE*	[2014Il01]	
^{122}Cd			15(7)			^{122}Ag(β^-)		DC	[1995Za01]	
^{124}Cd	0.35(19)				^{124}Cd	^{104}Pd, ^{64}Zn	353.4 MeV	CE*	[2014Il01]	
^{126}Cd	0.27(6)				^{126}Cd	^{64}Zn	359.1 MeV	CE*	[2014Il01]	
^{126}Cd			14.9($^{+16.8}_{-5.0}$)		^{124}Cd	^{64}Zn?	359.1 MeV?	DSAM	[2014Il01]	
^{104}Sn	0.180(37)				^{104}Sn	^{197}Au	67A	CE*	[2013Ba57]	
^{104}Sn	0.173(28)				^{104}Sn	Pb	131A	CE	[2014Do19]	
^{104}Sn	0.163(26)				^{104}Sn	Pb	131A	CE	[2013DoZY]	Su
^{104}Sn	0.10(4)				^{104}Sn	^{197}Au	140A	CE*	[2013Gu13]	Su
^{106}Sn	0.195(39)				^{106}Sn	^{58}Ni	2.8A	CE*	[2008Ek01]	
^{106}Sn	0.240(58)				^{106}Sn	^{197}Au	81A	CE*	[2007Va22]	
^{108}Sn	0.222(19)				^{108}Sn	^{58}Ni	2.8A	CE*	[2008Ek01]	
^{108}Sn	0.230(39)				^{108}Sn	^{197}Au	78A	CE*	[2007Va22]	
^{108}Sn	0.230(57)				^{108}Sn	^{197}Au	142	CE	[2005Bb09]	
^{110}Sn	0.220(22)				^{110}Sn	^{58}Ni	2.8A	CE*	[2008EkZZ]	
^{110}Sn	0.220(22)				^{110}Sn	^{58}Ni	2.8A	CE*	[2007Ce02]	Su
^{110}Sn	0.240(32)				^{110}Sn	^{197}Au	79A	CE*	[2007Va22]	
^{110}Sn		19.7(18)			^{110}Sn	^{58}Ni	2.8A	CE*	[2006Ek01]	
^{112}Sn			0.65(4)		^{112}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{112}Sn	0.242(8)				^{58}Ni	^{112}Sn	175	CE	[2010Ku07]	
^{112}Sn	0.240(32)				^{112}Sn	^{197}Au	80A	CE*	[2007Va22]	
^{112}Sn			0.750($^{+150}_{-90}$)		n	^{112}Sn	1.7	TDSA	[2007Or04]	
^{112}Sn	0.260(60)				^{16}O	^{112}Sn	48	CE	[1981Jo03]	NR
^{112}Sn	0.229(5)				α	^{112}Sn	10.0,10.5, 10.6	CE	[1975Gr30]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{112}Sn	0.256(6)				α	^{112}Sn	10,46	CE*	[1970St20]	
^{112}Sn	0.33(6)				^{20}Ne, ^{14}N	^{112}Sn	16-26, 12-22, 36,53	CE	[1961An07]	
^{112}Sn	0.180(40)				α	^{112}Sn	14.5	CE*	[1957Al43]	
^{114}Sn			0.60(4)		^{114}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{114}Sn	0.232(8)				^{114}Sn	^{58}Ni	3.4A	CE*	[2008Do19,2011Ku05]	
^{114}Sn			0.56(11)		^{18}O	^{100}Mo	70	TDSA	[2001Ga52]	
^{114}Sn			0.45(15)		α	^{112}Cd	27	TDSA	[1991ViZW]	
^{114}Sn	0.25(6)				^{16}O	^{114}Sn	48	CE	[1981Jo03]	NR
^{114}Sn	0.25(5)				^{20}Ne, ^{14}N	^{114}Sn	16-26, 12-22,36,53	CE	[1961An07]	
^{114}Sn	0.20(7)				α	^{114}Sn	14.5	CE*	[1957Al43]	
^{116}Sn			0.68(4)		^{116}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{116}Sn	0.1883(171)				γ	^{116}Sn	4.1	GG	[2000Br05]	NR
^{116}Sn	0.190(19)				γ	^{116}Sn	4.1,10	GG	[1994Go25]	
^{116}Sn			0.53(6)		γ	^{116}Sn	0.5-1.65	GG	[1981Ca10]	NR
^{116}Sn	0.216(5)				^{16}O	^{116}Sn	48	CE	[1981Jo03]	NR
^{116}Sn	0.215(24)				γ	^{116}Sn	?	GG	[1977Ca14]	Su
^{116}Sn	0.229(15)				e	^{116}Sn	40-110	EE	[1976Li19]	
^{116}Sn	0.195(7)				α	^{116}Sn	10.0, 10.5, 10.6	CE	[1975Gr30]	
^{116}Sn	0.216(5)				α	^{116}Sn	10, 46	CE*	[1970St20]	
^{116}Sn	0.223(13)				α	^{116}Sn	2-2.5A	CE	[1970Kl06]	
^{116}Sn	0.183(37)				e	^{116}Sn	60	EE	[1969Cu06]	
^{116}Sn	0.145(21)				e	^{116}Sn	150	EE	[1967Ba52]	
^{116}Sn			0.48(10)		γ	^{116}Sn	1.3	GG	[1963Be14]	
^{116}Sn			0.71(13)		γ	^{116}Sn	1.3	GG	[1962Li10]	
^{116}Sn			0.64(27)		γ	^{116}Sn	1.3	GG	[1962Ka28]	
^{116}Sn	0.29(6)				^{20}Ne, ^{14}N	^{116}Sn	16-26, 12-22, 36,53	CE	[1961An07]	
^{116}Sn	0.207(27)				p, α	^{116}Sn	1.5-3.3, 8-10	CE	[1958St32]	
^{116}Sn	0.19(6)				α	^{116}Sn	14.5	CE*	[1957Al43]	
^{118}Sn			0.79(4)		^{118}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{118}Sn	0.2051(286)				γ	^{118}Sn	4.1	GG	[2000Br05]	NR
^{118}Sn	0.198(5)				e	^{118}Sn	252,376	EE	[1992Wi06]	
^{118}Sn	0.156(6)				e	^{118}Sn	147.4-356	EE	[1991Pe07]	
^{118}Sn	0.204(4)				^{12}C	^{118}Sn	37-38	CE	[1989Sp03]	
^{118}Sn			0.69(7)		γ	^{118}Sn	0.5-1.65	GG	[1981Ca10]	NR
^{118}Sn	0.216(5)				^{16}O	^{118}Sn	48	CE	[1981Jo03]	NR
^{118}Sn	0.212(22)				γ	^{118}Sn	1.2	GG	[1977Ca14]	Su
^{118}Sn	0.199(6)				α	^{118}Sn	10.0, 10.5, 10.6	CE	[1975Gr30]	
^{118}Sn	0.216(5)				α	^{118}Sn	10, 46	CE*	[1970St20]	
^{118}Sn	0.172(34)				e	^{118}Sn	60	EE	[1969Cu06]	
^{118}Sn	0.230(20)				γ	^{118}Sn	1.2	GG	[1966Hr03]	
^{118}Sn	0.240(40)				^{20}Ne, ^{14}N	^{118}Sn	16-26, 12-22, 36,53	CE	[1961An07]	
^{118}Sn	0.228(27)				p, α	^{118}Sn	1.5-3.3, 8-10	CE	[1958St32]	
^{118}Sn	0.19(5)				α	^{118}Sn	14.5	CE*	[1957Al43]	
^{120}Sn			0.97(5)		^{120}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{120}Sn	0.2521(299)				γ	^{120}Sn	4.1	GG	[2000Br05]	NR
^{120}Sn	0.194(3)				^{12}C	^{120}Sn	37-38	CE	[1989Sp03]	
^{120}Sn			1.04(9)		γ	^{120}Sn	0.5-1.65	GG	[1981Ca10]	
^{120}Sn	0.203(4)				^{16}O	^{120}Sn	48	CE	[1981Jo03]	NR
^{120}Sn	0.179(16)				γ	^{120}Sn	1.2	GG	[1977Ca14]	Su
^{120}Sn	0.1970(40)				α	^{120}Sn	10.0, 10.5, 10.6	CE	[1975Gr30]	
^{120}Sn			0.95(6)		^{35}Cl	^{120}Sn	100	TDSA	[1972SiZP]	Su
^{120}Sn			0.890(20)		^{35}Cl	^{120}Sn	100	TDSA	[1972SiZI]	
^{120}Sn	0.2030(40)				α	^{120}Sn	10, 46	CE*	[1970St20]	
^{120}Sn	0.173(35)				e	^{120}Sn	60	EE	[1969Cu06]	
^{120}Sn	0.123(21)				e	^{120}Sn	150	EE	[1967Ba52]	
^{120}Sn	0.152(29)				γ	^{120}Sn	1.2	GG	[1966Hr03]	
^{120}Sn	0.26(5)				^{20}Ne, ^{14}N	^{120}Sn	16-26, 12-22, 36, 53	CE	[1961An07]	
^{120}Sn	0.220(22)				p, α	^{120}Sn	1.5-3.3, 8-10	CE	[1958St32]	
^{120}Sn	0.170(40)				α	^{120}Sn	14.5	CE*	[1957Al43]	
^{122}Sn			1.29(8)		^{122}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{122}Sn	0.2328(333)				γ	^{122}Sn	4.1	GG	[2000Br05]	NR
^{122}Sn	0.182(3)				^{12}C	^{122}Sn	37-38	CE	[1989Sp03]	
^{122}Sn	0.196(4)				^{16}O	^{122}Sn	48	CE	[1981Jo03]	NR
^{122}Sn	0.1880(40)				α	^{122}Sn	10.0, 10.5, 10.6	CE	[1975Gr30]	
^{122}Sn	0.1960(40)				α	^{122}Sn	10, 46	CE*	[1970St20]	
^{122}Sn	0.26(5)				^{20}Ne, ^{14}N	^{122}Sn	16-26, 12-22, 36,53	CE	[1961An07]	
^{122}Sn	0.252(30)				p, α	^{122}Sn	1.5-3.3, 8-10	CE	[1958St32]	
^{122}Sn	0.150(30)				α	^{122}Sn	14.5	CE*	[1957Al43]	
^{124}Sn			1.58(10)		^{124}Sn	^{12}C	378	TDSA	[2012Ku24]	
^{124}Sn	0.162(6)				^{124}Sn	^{12}C, ^{50}Ti	3A	CE*	[2011Al25]	
^{124}Sn			1.48(15)		^{124}Sn	C,Gd,Cu	4A	TDSA	[2011Ju01]	
^{124}Sn	0.1629(224)				γ	^{124}Sn	4.1	GG	[2000Br05]	NR
^{124}Sn	0.166(22)				γ	^{124}Sn	4.1,10	GG	[1994Go25]	
^{124}Sn	0.161(4)				^{16}O	^{124}Sn	48	CE	[1981Jo03]	NR
^{124}Sn	0.140(6)				α	^{124}Sn	19.5	CE*	[1979Sa05]	Ex, MD, NR
^{124}Sn	0.140(3)				^{3}He	^{124}Sn	14.35	CE	[1979Sa05]	Ex, MD, NR
^{124}Sn	0.1700(40)				α	^{124}Sn	10.0, 10.5, 10.6	CE	[1975Gr30]	
^{124}Sn	0.188(13)				α	^{124}Sn	2-2.5A	CE	[1970Kl06]	
^{124}Sn	0.1610(40)				α	^{124}Sn	10, 46	CE*	[1970St20]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{124}Sn	0.180(20)				^{14}N	^{124}Sn	44, 48	CE*	[1968La26]	
^{124}Sn	0.133(22)				e	^{124}Sn	150	EE	[1967Ba52]	
^{124}Sn	0.220(40)				^{20}Ne, ^{14}N	^{124}Sn	16-26, 12-22, 36, 53	CE	[1961An07]	
^{124}Sn	0.213(24)				p, α	^{124}Sn	1.5-3.3, 8-10	CE	[1958St32]	
^{124}Sn	0.140(30)				α	^{124}Sn	14.5	CE*	[1957Al43]	
^{126}Sn			1.50(20)		^{126}Sn	^{12}C	378	TDSA	[2012Ku24]	
^{126}Sn	0.127(8)				^{126}Sn	^{12}C, ^{50}Ti	3A	CE*	[2011Al25]	
^{126}Sn	0.10(3)				^{126}Sn	C	<3A	CE*	[2004Ra27]	
^{128}Sn	0.080(5)				^{128}Sn	^{12}C, ^{50}Ti	3A	CE*	[2011Al25]	
^{128}Sn	0.073(6)				^{128}Sn	C	<3A	CE*	[2004Ra27]	
^{130}Sn	0.023(5)				^{130}Sn	C	<3A	CE*	[2004Ra27]	
^{132}Sn	0.11(3)				^{132}Sn	^{48}Ti	470-495	CE*	[2005Va31]	
^{132}Sn	0.14(5)				^{132}Sn	C	<3A	CE*	[2004Ra27]	
^{134}Sn	0.029(5)				^{134}Sn	^{90}Zr	400	CE*	[2005Va31]	
^{134}Sn	0.029(5)				^{134}Sn	C	<3A	CE*	[2004Ra27]	
^{108}Te			11.0(13)		^{58}Ni	^{54}Fe	245	RDM	[2011Ba37]	
^{112}Te			5.7(5)		^{58}Ni	^{58}Ni	250	RDM	[2015Do04]	
^{114}Te			4.09(33)		^{24}Mg	^{93}Nb	90	TDSA	[2005Mo20]	
^{118}Te			8.8(14)		^{13}C	^{109}Ag	54	TDSA	[2002Pa19]	
^{120}Te	0.666(20)				^{58}Ni	^{120}Te	175	CE	[2014Sa49]	
^{120}Te			10.4(2)		^{120}Te	C	300	RDM	[2010We12]	
^{120}Te	0.77(16)				α	^{120}Te	<7	CE	[1956Te26]	
^{122}Te			10.70(7)		n	^{122}Te	1.72-3.35	TDSA	[2005Hi04]	
^{122}Te	0.75(3)				^{16}O, ^{32}S	^{122}Te	48,100	CE	[1989SvZZ]	Ex, Gos, NR
^{122}Te	0.53(2)				^{3}He	^{122}Te	19.52	CE*	[1979Sa05]	Ex, MD, NR
^{122}Te	0.6650(30)				α, ^{14}N, ^{16}O, ^{18}O	^{122}Te	8-10, 32-37, 30.5-42, 34-35	CE	[1978Be10]	
^{122}Te	0.664(20)				α	^{122}Te	8-18	CE*	[1977Sa04]	
^{122}Te	0.658(4)				α, ^{16}O	^{122}Te	10-11, 30-54	CE	[1976Bo12]	
^{122}Te	0.666(12)				α, ^{16}O	^{122}Te	8,10, 42,44.8	CE	[1974Ba45]	
^{122}Te	0.610(30)				^{14}N	^{122}Te	48	CE*	[1970LaZM]	
^{122}Te			10.5(16)		γ	^{122}Te	0.56	GG	[1964Pa17]	
^{122}Te	0.57(14)				γ	^{122}Te	0.56	GG	[1963Zi02]	
^{122}Te	0.63(16)				γ	^{122}Te	0.56	GG	[1963Sh17]	
^{122}Te	0.65(6)				α	^{122}Te	8,9,10	CE	[1961St02]	
^{122}Te	0.47(10)				α	^{122}Te	<7	CE	[1956Te26]	
^{124}Te	0.48(1)				α	^{124}Te	19.3*	CE	[1979Sa05]	Ex, MD, NR
^{124}Te	0.46(2)				^{3}He	^{124}Te	19.52*	CE	[1979Sa05]	Ex, MD, NR
^{124}Te	0.48(2)				^{3}He	^{124}Te	12.5-21.0*	CE	[1979Sa05]	Ex, MD, NR
^{124}Te	0.561(24)				α	^{124}Te	8-18	CE	[1977Sa04]	
^{124}Te	0.567(6)				α, ^{16}O	^{124}Te	8.5-17, 39-44	CE	[1975Kl07]	
^{124}Te	0.569(12)				α, ^{16}O	^{124}Te	9,10, 42,44.8	CE	[1974Ba45]	
^{124}Te	0.470(40)				d, α	^{124}Te	12, 14	CE	[1970Ch14]	
^{124}Te	0.710(40)				^{14}N	^{124}Te	48	CE*	[1970LaZM]	
^{124}Te			9.5(5)		γ	^{124}Te	0.6	GG	[1968Sc13]	
^{124}Te	0.83(5)				γ	^{124}Te	0.6	GG	[1963Zi02]	
^{124}Te	0.61(20)				^{14}N	^{124}Te	36-53	CE*	[1962Ga13]	
^{124}Te	0.75(10)				γ	^{124}Te	0.6	GG	[1961Ak02]	
^{124}Te	0.39(8)				α	^{124}Te	<7	CE	[1956Te26]	
^{126}Te	0.475				n	$^{239-241}$Pu	thermal	Fission-Corr	[2001Ge07]	
^{126}Te	0.457(14)				α	^{126}Te	8-18	CE	[1977Sa04]	
^{126}Te	0.466(8)				α, ^{16}O	^{126}Te	8.5-17, 39-44	CE	[1975Kl07]	
^{126}Te	0.479(12)				α, ^{16}O	^{126}Te	9,10, 42,44.8	CE	[1974Ba45]	
^{126}Te	0.510(25)				^{14}N	^{126}Te	48, 46	CE*	[1970LaZM]	
^{126}Te	0.420(40)				^{14}N	^{126}Te	44, 48	CE*	[1968La26]	
^{126}Te	0.487(35)				α, ^{16}O	^{126}Te	2-3A	CE	[1967St16]	
^{126}Te	0.532(37)				p	^{126}Te	1.5-3.3	CE	[1958St32]	
^{126}Te	0.32(6)				α	^{126}Te	<7	CE	[1956Te26]	
^{128}Te	0.346(26)				^{128}Te	C	350, 396	CE*	[2002Ra21]	
^{128}Te	0.383				n	$^{239-241}$Pu	thermal	Fission-Corr	[2001Ge07]	
^{128}Te	0.3760(30)				α, ^{14}N, ^{16}O, ^{18}O	^{128}Te	8-10, 32-37, 30.5-42, 34-35	CE	[1978Be10]	
^{128}Te	0.380(9)				α	^{128}Te	8-18	CE*	[1977Sa04]	
^{128}Te	0.378(7)				α, ^{16}O	^{128}Te	8.5-17, 39-44	CE*	[1975Kl07]	
^{128}Te	0.387(11)				α, ^{16}O	^{128}Te	9,10, 42, 44.8	CE	[1974Ba45]	
^{128}Te	0.390(20)				^{14}N	^{128}Te	48	CE*	[1970LaZM]	
^{128}Te	0.390(29)				α, ^{16}O	^{128}Te	2-3A	CE	[1967St16]	
^{128}Te	0.412(33)				p	^{128}Te	1.5-3.3	CE	[1958St32]	
^{128}Te	0.28(6)				α	^{128}Te	<7	CE	[1956Te26]	
^{130}Te	0.291(10)				^{130}Te	C	342.8, 390	CE*	[2013St24]	
^{130}Te	0.295				n	$^{239-241}$Pu	thermal	Fission-Corr	[2001Ge07]	
^{130}Te	0.295(7)				α	^{130}Te	10-11, 30-54	CE*	[1976Bo12]	
^{130}Te	0.290(11)				α, ^{16}O	^{130}Te	9,10, 42, 44.8	CE*	[1974Ba45]	
^{130}Te	0.302(16)				^{14}N	^{130}Te	46, 48.5	CE*	[1970LaZM]	
^{130}Te	0.300(30)				α	^{130}Te	8.5-10, 30-42	CE*	[1970Ch01]	
^{130}Te	0.340(30)				^{14}N	^{130}Te	36-53	CE*	[1962Ga13]	NR
^{130}Te	0.340(31)				p	^{130}Te	1.5-3.3	CE	[1958St32]	
^{130}Te	0.26(5)				α	^{130}Te	<7	CE	[1956Te26]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{132}Te	0.19(3)				^{132}Te	C	350	CE*	[2003Ba01]	
^{132}Te	0.216(21)				^{132}Te	C	350, 396	CE*	[2002Ra21,2011Da21]	
^{132}Te	0.143				n	$^{239-241}$Pu	thermal	Fission-Corr	[2001Ge07]	
^{134}Te	0.104(4)				^{134}Te	C	390	CE*	[2013St24]	
^{134}Te	0.13(4)				^{134}Te	C	350	CE*	[2003Ba01]	
^{134}Te	0.114(13)				^{134}Te	C	350, 396	CE*	[2002Ra21,2011Da21]	
^{136}Te	0.122(18)				^{136}Te	C	350, 396	CE*	[2002Ra21,2011Da21]	
^{114}Xe	1.0330(666)				^{58}Ni	^{58}Ni	210	RDM/ TDSA	[2002De26]	
^{114}Xe			23.8(16)		^{58}Ni	^{58}Ni	215	RDM	[1998De29]	
^{116}Xe			35.1(13)		^{60}Ni	^{58}Ni	215	RDM	[1998De29]	
^{118}Xe			65(4)		^{29}Si	^{93}Nb	135	RDM	[2002Go36]	
^{118}Xe			63(6)			^{118}Cs(β^+)		DC	[1992MaZR]	
^{118}Xe			65.0(30)		^{14}N	^{107}Ag	60	RDM	[1980KaZT]	
^{118}Xe			69(5)		^{14}N	^{107}Ag	50-85	RDM	[1977BeYM]	
^{120}Xe			64.0(40)			^{120}Cs(β^+)		DC	[1996Ma16]	
^{120}Xe			64(5)		^{18}O	^{106}Pd	70	RDM	[1995Wa25]	
^{120}Xe			75(7)					RDM	[1990DeZN]	
^{120}Xe			89		^{19}F	^{104}Pd	81	RDM	[1985ChZY]	Ex, NR
^{120}Xe			122(12)		^{14}N	^{109}Ag	60	RDM	[1980KaZT]	Ex
^{120}Xe			124(15)		^{16}O	^{108}Pd	75,80	RDM	[1972Ku14]	Ex
^{122}Xe			72.0(40)		^{16}O	^{110}Pd	66	RDM	[1998Go03]	
^{122}Xe			70.0(20)		^{18}O	^{108}Pd	76	RDM	[1994Pe02]	
^{122}Xe			75(5)					RDM	[1993SaZT]	
^{122}Xe			$51(^{+10}_{-6})$		^{18}O	^{107}Ag	78	RDM	[1992Dr05]	
^{122}Xe			89.3(81)		^{16}O	^{110}Pd	75,80	RDM	[1972Ku14]	
^{124}Xe			$64(^{+10}_{-8})$		^{124}Xe	^{93}Nb	55A	RDM	[2006Ch26]	
^{124}Xe	$1.12(^{+12}_{-9})$				^{124}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{124}Xe			67.5(17)		^{18}O	^{110}Pd	80	TDSA/ RDM	[2004Sa47]	
^{124}Xe			82.0(40)		^{16}O	^{110}Pd	66	RDM	[1998Go03]	
^{124}Xe			60(5)					RDM	[1990DeZN]	
^{124}Xe			48(3)		α	^{122}Te	23-27.2	Conversion e^-	[1982GaZH]	NR
^{124}Xe	0.90(7)				^{16}O	^{124}Xe	36,42	CE	[1975Go18]	
^{126}Xe	$1.02(^{+13}_{-6})$				^{124}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{126}Xe	1.06(3)				α	^{123}Te	15.5	Fusion evaporation	[2000Ga08]	NR
^{126}Xe	0.762(25)				^{16}O	^{126}Xe	36	CE	[1977Ar19]	
^{126}Xe	0.79(6)				^{16}O	^{126}Xe	36,42	CE	[1975Go18]	
^{126}Xe			59.6(20)			^{126}I(β^-)		DC	[1963De21]	
^{128}Xe			26(6)		^{128}Xe	Fe	525	RDM	[2011Ro53]	
^{128}Xe	$0.825(^{+11}_{-12})$				^{128}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{128}Xe	0.90(10)				^{128}Xe	Pb	4.3A	CE*	[1993Sr01]	NR
^{128}Xe	0.767(32)				^{16}O	^{128}Xe	36	CE	[1977Ar19]	
^{128}Xe	0.79(4)				α	^{128}Xe	10-13	CE	[1975EdZY]	NR
^{128}Xe	0.69(5)				^{16}O	^{128}Xe	36,42	CE	[1975Go18]	
^{128}Xe	0.89(23)				α	^{128}Xe	6.45	CE	[1958Pi05]	NR
^{130}Xe	$0.585(^{+9}_{-6})$				^{130}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{130}Xe		37.1(17)			^{130}Xe	Ti	485-508	CE	[2002Ja02]	
^{130}Xe	0.635(48)				^{16}O	^{130}Xe	36	CE	[1977Ar19]	
^{130}Xe	0.58(5)				α	^{130}Xe	10-13	CE	[1975EdZY]	NR
^{130}Xe	1.00(8)				^{16}O	^{130}Xe	36,42	CE	[1975Go18]	
^{130}Xe			12.0(30)			^{130}I(β^-)		DC	[1974Bu13]	
^{130}Xe	0.69(15)				γ	^{130}Xe	0.390-0.530	GG	[1970Ke15]	
^{130}Xe	0.64				α	^{130}Xe	6.45	CE	[1958Pi05]	NR
^{132}Xe	$0.499(^{+36}_{-32})$				^{132}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{132}Xe		23.7(6)			^{132}Xe	Ti	485-508	CE	[2002Ja02]	
^{132}Xe	0.473(29)				^{16}O	^{132}Xe	36	CE	[1977Ar19]	
^{132}Xe	0.440(30)				^{16}O	^{132}Xe	36,42	CE	[1975Go18]	
^{132}Xe	0.35(11)				γ	^{132}Xe	0.673	GG	[1961Ha36]	
^{134}Xe	$0.322(^{+41}_{-16})$				^{134}Xe	^{58}Ni	550-580	CE*	[2006Mu04]	
^{134}Xe		14.7(1)			^{134}Xe	Ti	485-508	CE	[2002Ja02]	
^{134}Xe		10.3(4)			^{134}Xe	Ti	485-508	CE	[2002Ja02]	
^{134}Xe	0.34(6)				α	^{134}Xe	10-13	CE	[1975EdZY]	
^{136}Xe	0.2139(83)				^{136}Xe	Ti	485	DC	[2002Ja02]	
^{136}Xe			0.30(5)		^{32}S	^{136}Xe	100	TDSA	[1993Sp01]	
^{136}Xe	0.18(8)				α	^{136}Xe	10-13	CE	[1975EdZY]	
^{138}Xe	0.38(10)				^{138}Xe	^{96}Mo	2.84A	CE*	[2007Kr19,2008KrZZ]	
^{140}Xe	0.52(10)				^{140}Xe	^{96}Mo	2.84A	CE*	[2007Kr19,2008KrZZ]	
^{140}Xe			101.0(72)			^{140}I(β^-)		DC	[1999Li18]	NR
^{140}Xe			163(7)			^{254}Cf(SF)		DC	[1980ChZM]	Ex
^{142}Xe	0.69(10)				^{142}Xe	^{96}Mo	2.84A	CE*	[2007Kr19,2008KrZZ]	
^{144}Xe	0.726(174)?								[2008KrZZ,2007Kr12]	
^{122}Ba			536(30)		^{16}O, ^{13}C	^{108}Cd, ^{112}Sn	62-65, 59	RDM	[2010Bi11]	
^{122}Ba			430(39)			^{122}La(β^+)		DC	[1992Mo13]	
^{124}Ba			275(12)		^{19}F	^{109}Ag	75	RDM	[1998Uc01]	
^{124}Ba			286(6)					RDM	[1993SaZT]	
^{124}Ba			245(18)		^{28}Si	^{100}Mo	115	RDM	[1992De60]	
^{124}Ba			428(38)			^{124}La(β^+)		DC	[1992Mo13]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{126}Ba			204(6)		^{30}Si	^{100}Mo	130	RDM	[1996De50]	
^{126}Ba			203(20)			^{126}La(β^+)		DC	[1992Mo13]	
^{126}Ba			170(13)		^{30}Si	^{100}Mo	130	RDM	[1989Sc06]	
^{126}Ba			188($^{+10}_{-30}$)		^{16}O	^{114}Cd	80	RDM	[1979Se03]	
^{126}Ba			173(28)		^{16}O	^{114}Cd	75-80	RDM	[1972Ku14]	
^{126}Ba			270(50)		^{14}N	^{115}In	3.7-7.5A	RDM	[1967Cl02]	
^{128}Ba			152(13)		^{16}O	^{116}Cd	76	RDM	[2000Pe20]	NR
^{128}Ba			144($^{+4}_{-8}$)		^{18}O	^{114}Cd	76	RDM	[1992Pe06]	
^{128}Ba			140(30)		^{16}O	^{116}Cd	75-80	RDM	[1972Ku14]	
^{130}Ba			62.3(7)		^{18}O	^{116}Cd	76	RDM	[2000St07]	NR
^{130}Ba			62.0(14)		^{18}O	^{116}Cd	76	RDM	[1998StZX]	Su
^{130}Ba	1.163(16)				α, ^{12}C, ^{16}O	^{130}Ba	10.8-11.8, 32-38, 43-49	CE	[1989Bu07]	
^{130}Ba			56(5)					RDM	[1985VoZY]	
^{130}Ba	1.21(38)				^{40}Ca, ^{32}S, α	^{130}Ba	85, 70, 80, 10.5	CE	[1973ToXW]	
^{130}Ba	1.36(14)				^{16}O	^{130}Ba	19-27	CE	[1967Si03]	
^{130}Ba	0.75(18)				α	^{130}Ba	<5.6	CE	[1958Fa01]	
^{132}Ba	0.86(6)				^{12}C	^{132}Ba	38-42	CE	[1985Bu01]	
^{132}Ba	0.73(18)				α	^{132}Ba	<5.6	CE	[1958Fa01]	
^{134}Ba	0.655(6)				α, ^{12}C, ^{16}O	^{134}Ba	10.8-11.8, 32-38, 43-49	CE	[1989Bu07]	
^{134}Ba	0.671(18)				^{12}C	^{134}Ba	38-42	CE	[1985Bu01]	
^{134}Ba	0.700(15)				α, ^{12}C, ^{18}O, ^{16}O	^{134}Ba	11.3, 35, 52.5, 48-52.5	CE	[1977Kl05]	
^{134}Ba	0.50(7)				^{40}Ca, ^{32}S	^{134}Ba	85, 70, 80	CE	[1973ToXW]	
^{134}Ba	0.672(16)				^{16}O	^{134}Ba	42, 47, 50	CE	[1972Ke16]	
^{134}Ba	0.75(25)				N	^{134}Ba	52	CE*	[1963Al31]	
^{136}Ba	0.46(4)				^{136}Ba	C	350, 396	CE*	[2002Ra21]	
^{136}Ba	0.418(5)				α, ^{7}Li, ^{16}O	^{136}Ba	11-11.8, 15,16, 45-49	CE	[1986Ro15]	
^{136}Ba	0.3990(30)				α	136Be	42-44.5	CE*	[1984Be20]	
^{136}Ba			3.14(44)		^{35}Cl	^{136}Ba	56-68	TDSA	[1973Fi15]	
^{136}Ba	0.418(11)				^{16}O	^{136}Ba	42, 47, 50	CE	[1972Ke16]	
^{136}Ba	0.53(16)				N	^{136}Ba	52	CE*	[1963Al31]	
^{138}Ba			0.265(29)		γ	^{138}Ba	4.1	GG	[1995He25]	NR
^{138}Ba			0.280($^{+180}_{-90}$)		n	^{138}Ba	1.75	TDSA	[1993Be03]	
^{138}Ba	0.241(6)				α, ^{12}C, ^{16}O	^{138}Ba	10.8-11.8, 32-38, 43-49	CE	[1989Bu07]	
^{138}Ba	0.236(11)				^{12}C	^{138}Ba	38-42	CE*	[1985Bu01]	
^{138}Ba	0.2170(30)				α	^{138}Ba	12.15-12.40	CE	[1978Ki09]	
^{138}Ba	0.238(17)				γ	^{138}Ba	1.5-5.1	GG	[1977Sw03]	
^{138}Ba	0.221(9)				^{16}O	^{138}Ba	42, 47, 50	CE	[1972Ke16]	
^{138}Ba	0.249(13)				e	^{138}Ba	40,60	EE	[1972LeYB]	
^{138}Ba	0.27(9)				N	^{138}Ba	52	CE*	[1963Al31]	
^{138}Ba	0.38(11)				^{20}Ne, ^{14}N	^{138}Ba	16-26, 12-22,36,53	CE	[1961An07]	
^{140}Ba	0.484 ($^{+38}_{-101}$)				^{140}Ba	^{96}Mo	392	CE*	[2012Ba40]	
^{140}Ba			10.4($^{+22}_{-8}$)		^{140}Ba	^{96}Mo	392	TDSA	[2012Ba40]	
^{140}Ba	0.4564				^{140}Ba		∼2.85A	CE*	[2008KrZZ,2007Kr12]	Ex
^{140}Ba			14(6)			^{140}Cs(β^-)		DC	[1989Ma38]	
^{142}Ba			119(12)			^{252}Cf(SF)		TDSA	[2005Bi02]	
^{142}Ba			94(3)			^{142}Cs(β^-)		DC	[1990Ma25]	NR
^{142}Ba			95.0(30)			^{142}Cs(β^-)		DC	[1989Mo06]	Su
^{142}Ba			86(6)			^{252}Cf(SF)		RDM	[1986Ma22]	
^{142}Ba			114(9)			^{254}Cf(SF)		DC	[1980ChZM]	
^{142}Ba			100(60)					DC	[1975JaYL,1974JaZN]	Su, NR
^{144}Ba			1140(70)			^{252}Cf(SF)		TDSA	[2005Bi02]	
^{144}Ba			1025(40)			^{144}Cs(β^-)		DC	[1990Ma25]	NR
^{144}Ba			1475(597)			^{252}Cf(SF)		RDM	[1986Ma22]	
^{144}Ba			971(156)			^{252}Cf(SF)		RDM	[1983MaYT]	
^{144}Ba			1010(100)			^{254}Cf(SF)		DC	[1980ChZM]	
^{144}Ba			1230(220)			^{144}Cs(β^-)		DC	[1976MoZB]	
^{144}Ba			1010(43)					DC	[1975JaYL,1974JaZN]	Su, NR
^{144}Ba			1440(290)			^{252}Cf(SF)		DC	[1970Wa05]	
^{146}Ba			1240(42)			^{146}Cs(β^-)		DC	[1990Ma25]	NR
^{146}Ba			1330(170)			^{254}Cf(SF)		DC	[1980ChZM]	
^{146}Ba			1240(90)					DC	[1975JaYL,1974JaZN]	Su, NR
^{124}Ce			1270(280)		^{35}Cl	^{92}Mo	145	RDM	[1995Ma96]	
^{126}Ce			560(110)		^{37}Cl	^{92}Mo	145	RDM	[1995Ma96]	
^{126}Ce			949(53)		^{40}Ca	^{92}Mo	150-200	RDM	[1988Mo08]	Ex
^{126}Ce			949(53)		^{35}Cl	^{94}Mo	150	RDM	[1987IsZX]	NR
^{128}Ce			385(31)		^{40}Ca	^{92}Mo	150-200	RDM	[1988Mo08]	
^{128}Ce			427($^{+38}_{-34}$)		^{40}Ar	^{92}Zr	159	RDM	[1984We17]	
^{130}Ce			181.3(70)		^{28}Si	^{110}Pd	125	RDM	[1999Kl11]	NR
^{130}Ce			180(15)		^{16}O	^{117}Sn	76.5	RDM	[1984To10]	
^{130}Ce			209(15)		^{16}O	^{118}Sn	76	RDM	[1977Hu10]	
^{130}Ce			211(9)		^{16}O	^{118}Sn	82	RDM	[1975Bu08]	
^{130}Ce			225(20)		^{16}O	^{118}Sn	68-76	RDM	[1974De12]	
^{132}Ce			70.1(32)		^{28}Si	^{110}Pd	125	RDM	[1999Kl11]	NR
^{132}Ce			58(9)		^{36}S	^{100}Mo	145	RDM	[1989Ki01]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{132}Ce			57(4)		^{16}O	^{120}Sn	76	RDM	[1977Hu10]	
^{132}Ce			68(10)		^{16}O	^{120}Sn	68-76	RDM	[1974De12]	
^{134}Ce			32.7(28)		^{16}O	^{122}Sn	76	RDM	[1977Hu10]	
^{134}Ce			36(8)		^{16}O	^{122}Sn	68-76	RDM	[1974De12]	
^{136}Ce	0.814(90)				p	^{136}Ce	3	CE*	[1989Ga24]	NR
^{138}Ce			2.84(6)		^{138}Ce	^{24}Mg	480	CE*	[2014Na15]	
^{138}Ce	0.461(50)				p	^{138}Ce	3	CE*	[1989Ga24]	NR
^{138}Ce	0.450(30)				α	^{138}Ce	9, 10	CE	[1989Lo01]	
^{140}Ce			0.131(10)		γ	^{140}Ce	4.1	GG	[1995He25]	NR
^{140}Ce			$0.110(^{+40}_{-30})$		n	Ce	1.75	TDSA	[1993Be03]	
^{140}Ce	0.304(8)				e	^{140}Ce	190	EE	[1992Ki10]	NR
^{140}Ce			0.129(4)		^{32}S	Ce	110	TDSA	[1991Ba38]	
^{140}Ce	0.2950(40)				α	^{140}Ce	12.5-12.8	CE	[1978Ki09]	
^{140}Ce	0.280(37)				e	^{140}Ce	50, 65	EE	[1973Pi04]	
^{140}Ce	0.27(5)				^{16}O	^{140}Ce	31-45	CE	[1966Ec02]	
^{140}Ce			0.216(87)		γ	^{140}Ce		GG	[1964Be25]	NR
^{140}Ce	0.27(5)				^{14}N, α	Ce	52.5, 15	CE*	[1961An07]	
^{140}Ce			4.8(19)					GG	[1960Dz03]	Ex, NR
^{140}Ce	0.31				α	Ce	17	CE	[1960Na13]	Ex, NR
^{140}Ce			0.110(15)		γ			GG	[1959Of14]	
^{142}Ce			8.19(9)		^{142}Ce	^{24}Mg	494	CE*	[2014Na15]	
^{142}Ce									[1995Va25]	Ex
^{142}Ce	0.461(21)				e	^{142}Ce	100-370 MeV	EE	[1991Ki13]	NR
^{142}Ce			8.20(100)		^{32}S	Ce	110	TDSA	[1991Ba38]	Un
^{142}Ce	0.480(6)				α, ^{12}C, ^{16}O	^{142}Ce	10-12, 32-35, 45-49	CE	[1989Sp07]	
^{142}Ce			14(7)					DC	[1989Mo06]	
^{142}Ce	0.480(6)				α, ^{12}C, ^{16}O	^{142}Ce	10-12, 31-38, 44-50	CE	[1988Ve08]	Su
^{142}Ce	0.65(20)				e	^{142}Ce	50, 65	EE	[1973Pi04]	
^{142}Ce	0.459(6)				^{16}O	^{142}Ce	42	CE	[1970En01]	
^{142}Ce	0.42(5)				^{16}O	^{142}Ce	31-45	CE	[1966Ec02]	
^{142}Ce	0.41(8)				^{14}N, α	Ce	52.5, 15	CE*	[1961An07]	
^{142}Ce	0.59				α	Ce	17	CE	[1960Na13]	Ex, NR
^{144}Ce			42(10)					DC	[1989Ma38]	
^{144}Ce			51(5), 43(8)					DC	[1989Mo06]	Su
^{146}Ce			273(15)					DC	[1989Ma38]	
^{146}Ce			346(43)					DC	[1980ChZM]	
^{146}Ce			380(70)					DC	[1975JaYL,1974JaZN]	NR
^{148}Ce			1300(430)					DC	[2006Hw01]	
^{148}Ce			1370(120)					DC	[1980ChZM]	
^{148}Ce			1530(120)					DC	[1975JaYL,1974JaZN]	NR
^{148}Ce			1880(290)					DC	[1970Wa05]	
^{150}Ce			4400(800)					DC	[1980ChZM]	
^{150}Ce			5200(1400)					DC	[1975JaYL,1974JaZN]	NR
^{152}Ce			3607.5(7215)					DC	[2005Fo17]	
^{130}Nd			864(355)		^{40}Ca	^{96}Ru	180	RDM	[1989Mo10]	
^{132}Nd			192(11)		^{32}S	^{107}Ag	170	RDM	[1995Ma96]	
^{132}Nd			268(19)		^{40}Ca	^{96}Ru	180	RDM	[1989Mo10]	
^{132}Nd			350(30)		^{92}Mo	^{46}Ti, ^{50}Cr	210, 230	RDM	[1987Wa02]	Ex
^{132}Nd			317(29)		^{32}S	^{107}Ag	160	RDM	[1986Ma39]	Su
^{134}Nd			94.4(30)		^{28}Si	^{110}Pd	125	RDM	[1999Kl11]	NR
^{134}Nd			80(10)		^{32}S	^{107}Ag	170	RDM	[1995Ma96]	
^{134}Nd			92(6)		^{28}Si	^{110}Pd	120-125	RDM	[1987Bi13]	
^{134}Nd			150(12)		^{46}Ti, ^{50}Cr	^{92}Mo	210, 230	RDM	[1987Wa02]	Ex
^{136}Nd	1.66(23)	80(11)			^{136}Nd	Au	126A	CE*	[2008Sa35]	
^{140}Nd	0.72(5)				^{140}Nd	^{48}Ti, ^{64}Zn	399	CE*	[2013Ba38]	
^{142}Nd			$0.130(^{+50}_{-30})$		n	Nd	1.75	TDSA	[1993Be03]	
^{142}Nd			0.159(16)		^{32}S	^{142}Nd	110-116	TDSA	[1991Ba38]	Un
^{142}Nd			$0.1687(^{+572}_{-344})$		γ	^{142}Nd	4.1	GG	[1990Pi04]	NR
^{142}Nd	0.265(4)				α	^{142}Nd	13.05-13.20	CE	[1978Ki09]	
^{142}Nd			0.165(12)		γ	^{142}Nd	1.85-5.0	GG	[1978Me16]	
^{142}Nd	0.437(37)				e	^{142}Nd	40, 60, 80	EE	[1974MaYP]	
^{142}Nd	0.27(3)				^{16}O	^{142}Nd	54-72	CE	[1973Ch13]	
^{142}Nd	0.289(8)				e	^{142}Nd	40, 60	EE	[1971Ma27]	
^{142}Nd	0.57(17)				^{16}O	^{142}Nd	50, 55, 60	CE	[1967BuZX]	
^{142}Nd	0.42(7)				^{16}O	^{142}Nd	43.81	CE	[1966Ec02]	
^{142}Nd	0.34				α	Nd	17	CE	[1960Na13]	Ex, NR
^{144}Nd	0.460(40)				e	^{144}Nd	112-400	EE	[1993Pe10]	
^{144}Nd	0.491(5)				α, ^{12}C, ^{16}O	^{144}Nd	10.5-12.7, 32-36, 44-49	CE	[1989Sp07]	
^{144}Nd	0.580(10)				α	^{144}Nd	10.5, 11	CE	[1988Ah01]	
^{144}Nd	0.56(6)							CE	[1980FaZW]	
^{144}Nd	0.510(16)				^{16}O	^{144}Nd	42	CE	[1971Cr01]	
^{144}Nd	0.48(8)				^{16}O	^{144}Nd	50, 55, 60	CE	[1967BuZX]	
^{144}Nd	0.44(5)				^{16}O	^{144}Nd	35-39	CE	[1966Ec02]	
^{144}Nd	0.23(5)							CE	[1960Le07]	
^{144}Nd	0.44				α	Nd	17	CE	[1960Na13]	Ex, NR
^{146}Nd			33(7)					DC	[1989Mo06]	
^{146}Nd	0.780(10)				α	^{146}Nd	10.5, 11	CE	[1988Ah01]	
^{146}Nd	0.81(7)							CE	[1980FaZW]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{146}Nd	0.616(28)				e	^{146}Nd	40, 60, 80	EE	[1974MaYP]	
^{146}Nd	0.705(34)				e	^{146}Nd	40, 60	EE	[1971Ma27]	
^{146}Nd	0.760(22)				^{16}O	^{146}Nd	42	CE	[1971Cr01]	
^{146}Nd	0.71(6)				α	^{146}Nd	12, 14	CE	[1970Ch14]	
^{146}Nd	0.68(10)				^{16}O	^{146}Nd	50, 55, 60	CE	[1967BuZX]	
^{146}Nd	0.65(7)				^{16}O	^{146}Nd	35-39	CE	[1966Ec02]	
^{146}Nd	0.85(25)				α	^{146}Nd	6	CE	[1955He64]	Ex
^{148}Nd	1.30(6)				^{148}Nd	^{208}Pb	700	CE*	[1997Ib01]	
^{148}Nd			115(4)		^{58}Ni	^{148}Nd	220	RDM	[1991Ib01]	
^{148}Nd	1.390(20)				α	^{148}Nd	10.5, 11	CE	[1988Ah01]	
^{148}Nd	1.42(5)							CE	[1980FaZW]	
^{148}Nd	1.36(3)				^{16}O	^{148}Nd	42	CE	[1971Cr01]	
^{148}Nd	1.05(16)				^{16}O	^{148}Nd	50, 55, 60	CE	[1967BuZX]	
^{148}Nd	0.96(10)				^{16}O	^{148}Nd	35-39	CE	[1966Ec02]	
^{148}Nd	1.58(47)				α	^{148}Nd	6	CE	[1955He64]	Ex
^{148}Nd			260(90)		p	Nd	0-3.4	CE	[1955Si12]	
^{150}Nd	2.82(4)				e	^{150}Nd	112-450	EE	[1993Sa06]	Ex
^{150}Nd	2.816(35)				α	^{150}Nd	10.5, 11	CE	[1988Ah01]	
^{150}Nd			2080(100)		^{40}Ar	^{150}Nd	149	RDM	[1978Ya02]	
^{150}Nd	2.720(40)				α	^{150}Nd	11.5	CE	[1977Wo02]	
^{150}Nd	1.49(13)				e	^{150}Nd	40, 60, 80	EE	[1974MaYP]	
^{150}Nd	2.75(8)				^{32}S	150Nd	86.95, 96.7, 102.0, 110.0	CE	[1973FrZN]	
^{150}Nd	1.49(10)				e	^{150}Nd	40, 60	EE	[1971Ma27]	
^{150}Nd	2.64(8)		2240(80)					MuonicX-ray	[1970Hi03]	Ex
^{150}Nd	2.72(6)				^{16}O, α	^{150}Nd		CE	[1969KeZX]	
^{150}Nd			2140(60)		p	^{150}Nd	3.5	PB	[1968Ri09]	
^{150}Nd			2191(34)		p	^{150}Nd		PB	[1967Ku07]	
^{150}Nd	2.67(10)				p, d	^{150}Nd	4	CE	[1963Bj04]	
^{150}Nd			2200(100)		p	^{150}Nd	2.8	PB	[1959Bi10]	
^{150}Nd			7000(2300)		p	Nd	0-3.4	CE	[1955Si12]	
^{150}Nd	2.3(8)				α	^{150}Nd	6	CE	[1955He64]	Ex
^{152}Nd			5760(320)					DC	[1999To04]	
^{152}Nd			6420(370)					DC	[1991He03]	
^{154}Nd			11111(2886)			^{252}Cf(SF)		DC	[1974JaZN]	NR
^{134}Sm			605(50)		^{92}Mo	^{46}Ti, ^{50}Cr	210, 230	RDM	[1987Wa02]	
^{136}Sm			128(12)		^{32}S	^{107}Ag	125-150	RDM	[1988So06]	
^{136}Sm			190(15)		^{92}Mo	^{46}Ti, ^{50}Cr	210, 230	RDM	[1987Wa02]	Ex
^{136}Sm			187(14)		^{32}S	^{107}Ag	160	RDM	[1986Ma39]	Ex
^{138}Sm			65(9)		^{35}Cl	^{107}Ag	155	RDM	[1986Ma39]	
^{138}Sm			48(10)		^{32}S	^{108}Pd, ^{109}Ag, ^{110,112}Cd	120-170	RDM	[1985Lu06]	
^{140}Sm			9.1(6)		^{20}Ne	^{124}Te	82	RDM	[2015Be25]	
^{142}Sm	0.70(9)	32(4)			^{142}Sm	^{48}Ti, ^{94}Mo,	405	CE	[2015St08]	
^{144}Sm			$0.55(^{+30}_{-15})$		n	^{144}Sm	2-4.5	TDSA	[1993Ga16]	NR
^{144}Sm			0.124(5)		^{32}S	^{144}Sm	110-116	TDSA	[1991Ba38]	
^{144}Sm			0.129(30)		γ	^{144}Sm	<5.2	GG	[1978Me08]	
^{144}Sm	0.262(6)				α	^{144}Sm	12.15-12.40	CE	[1978Ki09]	
^{144}Sm	0.25(5)				^{16}O	^{144}Sm	44.29	CE	[1966Ec02]	
^{144}Sm	0.39(12)				N	^{144}Sm	52	CE	[1963Al31]	
^{146}Sm			$7.3(^{+30}_{-73})$		^{11}B	^{139}La	54	RDM	[1982Ro05]	NR
^{148}Sm			11.14(112)		^{32}S	^{148}Sm	110-116	TDSA	[1991Ba38]	Un
^{148}Sm	0.725(25)				α, ^{16}O, ^{32}S	^{148}Sm		CE	[1973ClZF]	
^{148}Sm	0.811(37)				e	^{148}Sm	40, 60	EE	[1972LeYB]	
^{148}Sm			10.6(6)		^{40}Ar	^{148}Sm		RDM	[1971Di02]	
^{148}Sm	0.705(25)				α, ^{16}O	^{148}Sm	10-13, 34-50	CE	[1970Ge07]	
^{148}Sm	0.65(5)				α	^{148}Sm	15	CE	[1968Ve01]	
^{148}Sm	0.63(5)				^{16}O	^{148}Sm	49	CE	[1968Ke04]	
^{148}Sm	0.79(8)				^{16}O, ^{32}S	^{148}Sm	19-27, 41-54	CE	[1967Si03]	
^{148}Sm	0.70(8)				^{16}O	^{148}Sm	35.85, 39.21	CE	[1966Ec02]	
^{148}Sm	0.89(10)				p, d	^{148}Sm	4.5	CE	[1960El07]	
^{150}Sm	1.47(9)							MuonicX-ray	[1978Ya11]	Ex
^{150}Sm	1.36(10)				^{16}O	^{150}Sm	46	CE	[1977Ho10]	
^{150}Sm	1.43(5)				α, ^{16}O, ^{32}S	^{150}Sm		CE	[1973ClZF]	
^{150}Sm	1.32(8)				e	^{150}Sm	40, 60	EE	[1972LeYB]	
^{150}Sm			69.4(25)		^{40}Ar	^{150}Sm		RDM	[1971Di02]	
^{150}Sm	1.33(3)				α	^{150}Sm	9, 10	CE	[1971Ca35]	
^{150}Sm	1.29(7)				α	^{150}Sm	15	CE	[1968Ve01]	
^{150}Sm	1.22(8)				^{16}O	^{150}Sm	48	CE	[1968Ke04]	
^{150}Sm	1.44(15)				^{16}O, ^{32}S	^{150}Sm	19-27, 41-54	CE	[1967Si03]	
^{150}Sm	1.31(21)				^{16}O	^{150}Sm	49	CE	[1966Se06]	
^{150}Sm	1.37(15)				^{16}O	^{150}Sm	31.09, 39.21	CE	[1966Ec02]	
^{150}Sm	1.32(6)				p, d	^{150}Sm	4.5	CE	[1960El07]	
^{152}Sm			2043(16)		^{136}Xe	^{152}Sm	5.09A	DC	[2014Pl01]	
^{152}Sm			2020(29)					DC	[1992De29]	
^{152}Sm			2128(50)					DC	[1991He03]	
^{152}Sm			2014(9)					DC	[1988Ka21]	
^{152}Sm			1980(70)					DC	[1981Is14]	
^{152}Sm	3.457(9)				μ	^{152}Sm		MuonicX-ray	[1978Ya11]	Ex
^{152}Sm	3.43(4)				α	^{152}Sm	11.25-12.00	CE	[1977Fi01]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{152}Sm	3.45(6)				e	^{152}Sm	251.5	EE	[1977Na01]	
^{152}Sm	3.28(7)				μ	^{152}Sm		MuonicX-ray	[1975Ba72,1979Po04]	Ex, NR
^{152}Sm	3.47(7)				α	^{152}Sm	12	CE	[1974Wo01]	
^{152}Sm	3.46(5)				α	^{152}Sm	8-17	CE	[1974Sh12]	
^{152}Sm	3.46(11)				α	^{152}Sm	11-18	CE	[1973Br02]	
^{152}Sm	3.39(3)				α	^{152}Sm	10.5-12	CE	[1972Sa42]	
^{152}Sm	3.35(20)				e	^{152}Sm	40, 60	EE	[1972LeYB]	
^{152}Sm			1950(70)					DC	[1972El20]	
^{152}Sm	3.31(4)				^{16}O	^{152}Sm	23-35	CE	[1970KaZK]	
^{152}Sm	3.32(8)							MuonicX-ray	[1970Hi03]	Ex
^{152}Sm	3.45(28)				α	^{152}Sm	7, 8, 9, 10	CE	[1970Sa09]	
^{152}Sm			2030(60)					DC	[1968Ku03]	
^{152}Sm	3.1(5)				α	^{152}Sm	16	CE	[1968Ve01]	
^{152}Sm			2077(43)		p	^{152}Sm	3.5	PB	[1968Ri09]	
^{152}Sm			2120(70)		p	^{152}Sm		PB	[1967Wo06]	
^{152}Sm			2060(60)					DC	[1967Ba27]	
^{152}Sm			1960(90)					DC	[1966Mc07]	
^{152}Sm			2040(80)		^{16}O	^{152}Sm	35	RDM	[1966As03]	
^{152}Sm			2060(60)					DC	[1965Hu02]	
^{152}Sm	3.4(2)				^{14}N	^{152}Sm	11.0	CE	[1964Ho25]	
^{152}Sm	3.67(25)				^{16}O	^{152}Sm	14-50	CE	[1963Gr04]	
^{152}Sm			1980(60)					DC	[1963Fo02]	
^{152}Sm			2050(70)					DC	[1962Ba38]	
^{152}Sm			2120(220)					DC	[1961Sa21]	
^{152}Sm	3.53(10)				p, d, α	^{152}Sm	≈4	CE	[1961Be43]	
^{152}Sm	3.40(15)				p, d	^{152}Sm	4.5	CE	[1960El07]	
^{152}Sm			2090(80)		p	^{152}Sm	2.8	PB	[1959Bi10]	
^{152}Sm	3.20(36)				p	Sm	7	CE	[1958Sh01]	
^{152}Sm			1876					DC	[1956Be54]	Ex, NR
^{152}Sm	3.3(8)							CE	[1956Hu49]	
^{152}Sm	3.3(10)				α	^{152}Sm	6	CE	[1955He64]	
^{152}Sm			2020(140)					DC	[1955Su64]	
^{154}Sm				0.328(8)	μ	^{154}Sm		MuonicX-ray	[1979Po04]	Ex, NR
^{154}Sm	4.45(39)				e	^{154}Sm	80-300	EE	[1977HoZF]	
^{154}Sm	4.49(5)				α	^{154}Sm	11.25-12.00	CE	[1977Fi01]	
^{154}Sm	4.37(7)				α	^{154}Sm	8-17	CE	[1974Sh12]	
^{154}Sm	4.39(9)				α	^{154}Sm	11-20	CE	[1974Br31]	
^{154}Sm	4.29(4)				α	^{154}Sm	12	CE	[1974Wo01]	
^{154}Sm	4.26(7)				α	^{154}Sm	11-19	CE	[1973Be40,1975Le22]	
^{154}Sm	4.30(7)				α	^{154}Sm	10.5-12	CE	[1972Sa42]	
^{154}Sm	4.46(8)				α	^{154}Sm	10-18	CE	[1972BrYV]	
^{154}Sm	4.2(6)				α	^{154}Sm	16	CE	[1968Ve01]	
^{154}Sm			4330(90)		p	^{154}Sm	3.5	PB	[1968Ri09]	
^{154}Sm			4370(70)		p	^{154}Sm		PB	[1967Wo06]	
^{154}Sm	5.1(4)				^{14}N	^{154}Sm	11.0	CE	[1964Ho25]	
^{154}Sm	4.53(35)				p	^{154}Sm	3	CE	[1963Gr04]	
^{154}Sm	4.38(30)				^{16}O	^{154}Sm	14-50	CE	[1963Gr04]	
^{154}Sm	3.5(5)				p	^{154}Sm	3.18, 1.8	CE	[1961Go09]	
^{154}Sm	4.61(20)				p, d	^{154}Sm	4.5	CE	[1960El07]	
^{154}Sm			3950(350)		p	^{154}Sm	2.8	PB	[1959Bi10]	
^{154}Sm	3.45(40)				p	Sm	7	CE	[1958Sh01]	
^{154}Sm	6.8(17)							CE	[1956Hu49]	
^{154}Sm	4.7(14)				α	^{154}Sm	6	CE	[1955He64]	Ex
^{156}Sm			>3000					DC	[1970ChZH]	NR
^{138}Gd			308(17)		^{36}Ar	^{106}Cd	190	RDM	[2011Pr10]	
^{138}Gd			305(30)		^{50}Cr	^{92}Mo	230	RDM	[1988Bi03]	NR
^{146}Gd			<1		α	^{144}Sm	22-25	DSAM	[1978Og03]	NR
^{148}Gd			6.0(19)		^{11}B	^{141}Pr	49	RDM	[2003Po02]	
^{152}Gd			52(7)					DC	[1993Se08]	
^{152}Gd			49.3(22)		^{40}Ar	^{152}Gd	147.2	RDM	[1982Jo04]	
^{152}Gd			53(10)					DC	[1974El03]	
^{152}Gd	1.97(13)				α	^{152}Gd	10	CE	[1970Be36]	
^{152}Gd			40(14)					DC	[1967Ab06]	
^{152}Gd			76(13)					DC	[1961Bu17]	
^{152}Gd			<144.3					DC	[1956Be54]	Ex, NR
^{154}Gd			1708(7)					DC	[1995Ma03]	
^{154}Gd	3.36				^{32}S, ^{48}Ti, ^{58}Ni	^{154}Gd	118, 178, 228	CE	[1993Su16]	Ex, Gos, NR
^{154}Gd	3.87(6)				e^-	^{154}Gd	78-380	EE	[1986He09,1983He21]	NR
^{154}Gd	3.81(15)				μ	^{154}Gd		MuonicX-ray	[1983La08]	Ex
^{154}Gd	3.83(5)				α	^{154}Gd	11.5	CE	[1977Wo02]	
^{154}Gd	3.90(6)				α	^{154}Gd	11.8	CE	[1977Sc33]	
^{154}Gd	3.85(8)				α	^{154}Gd	11-17	CE	[1977Ro08,1977Ro26]	NR
^{154}Gd			1700(70)					DC	[1973GrXX]	
^{154}Gd			1700(60)					DC	[1972Aw04]	
^{154}Gd			1750(60)					DC	[1968Ku03]	
^{154}Gd			1702(43)					DC	[1963Fo02]	
^{154}Gd			1670(70)					DC	[1963Bu03]	
^{154}Gd			1659(43)					DC	[1961Na06]	
^{154}Gd			1700(50)					DC	[1961St04]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{154}Gd	3.43(30)				p, d	^{154}Gd	4.5	CE	[1960El07]	
^{154}Gd			1780(150)		p	^{154}Gd	2.8	PB	[1959Bi10]	
^{154}Gd	$3.4(^{+5}_{-3})$				p, d	^{154}Gd	4	CE	[1958Ra12]	
^{154}Gd			1587					DC	[1956Be54]	Ex, NR
^{154}Gd	2.8(42)							CE	[1956Hu49]	Ex, NR
^{154}Gd			1730(140)					DC	[1955Su64]	
^{154}Gd	5.1(15)				α	^{154}Gd	6	CE	[1955He64]	Ex
^{156}Gd	4.16				^{32}S	^{156}Gd	118	CE	[1993Su16]	Ex,Gos, NR
^{156}Gd	4.48(50)				e	^{156}Gd	25-56	EE	[1985Bo31]	
^{156}Gd	4.58(18)				μ	^{156}Gd		MuonicX-ray	[1983La08]	Ex
^{156}Gd	4.57(5)				α	^{156}Gd	11-17	CE	[1977Ro08,1977Ro26]	NR
^{156}Gd	4.63(5)				α	^{156}Gd	11.25-12.00	CE	[1977Fi01]	
^{156}Gd	4.59(9)				α	^{156}Gd	11.5	CE	[1977Wo02]	
^{156}Gd			3190(90)					DC	[1968Ku03]	
^{156}Gd			3247(722)					DC	[1968Wa08]	NR
^{156}Gd			3290(80)		p	^{156}Gd		PB	[1967Wo06]	
^{156}Gd			3200(120)					DC	[1966Mc07]	
^{156}Gd			3130(70)					DC	[1965Me08]	
^{156}Gd			3120(90)					DC	[1963Fo02]	
^{156}Gd			3200(80)					DC	[1962Ba38]	
^{156}Gd	3.6(5)				p	^{156}Gd	3.18, 1.8	CE	[1961Go09]	
^{156}Gd	4.57(25)				p, d	^{156}Gd	4.5	CE	[1960El07]	
^{156}Gd			2960(150)		p	^{156}Gd	2.8	PB	[1959Bi10]	
^{156}Gd			3160(100)					DC	[1959Be57]	
^{156}Gd			2740(140)					DC	[1958Na01]	
^{156}Gd	4.50(25)				p	^{156}Gd	4	CE	[1958Ra12]	
^{156}Gd	7.7(19)							CE	[1956Hu49]	
^{156}Gd	9.3(29)				α	^{156}Gd	6	CE	[1955He64]	Ex
^{158}Gd	5.07				^{32}S	^{158}Gd	118	CE	[1993Su16]	Ex,Gos, NR
^{158}Gd	4.48(5)				e	^{158}Gd	25-56	EE	[1985Bo31]	
^{158}Gd	4.94(20)				μ	^{158}Gd		MuonicX-ray	[1983La08]	Ex
^{158}Gd	4.97(5)				α	^{158}Gd	11-17	CE	[1977Ro08,1977Ro26]	NR
^{158}Gd	5.00(7)				α	^{158}Gd	11-13	CE	[1974Sh12]	
^{158}Gd	5.03(8)				α	^{158}Gd	12	CE	[1974Wo01]	
^{158}Gd	4.97(14)				α	^{158}Gd	11-13	CE	[1972Er04]	
^{158}Gd			3740(170)		^{16}O	^{158}Gd	30	DC	[1969Av01]	
^{158}Gd			3740(240)					DC	[1968Sc04]	
^{158}Gd			3640(120)					DC	[1968Ku03]	
^{158}Gd			3690(80)		p	^{158}Gd		PB	[1967Wo06]	
^{158}Gd			3560(140)					DC	[1966Fu03]	
^{158}Gd			3370(150)		p	^{158}Gd	2.8	PB	[1962Bi05]	
^{158}Gd	4.5(7)				p	^{158}Gd	3.18, 1.8	CE	[1961Go09]	
^{158}Gd	5.44(25)				p, d	^{158}Gd	4.5	CE	[1960El07]	
^{158}Gd			4030(350)		p	^{158}Gd	2.8	PB	[1959Bi10]	Su
^{158}Gd	5.36(25)				p	^{158}Gd	4	CE	[1958Ra12]	
^{158}Gd	6.5(16)							CE	[1956Hu49]	Ex, NR
^{158}Gd	12.2(37)				α	^{158}Gd	6	CE	[1955He64]	Ex
^{160}Gd			3940(120)					DC	[2010NaZY]	
^{160}Gd	4.63				^{58}Ni	^{160}Gd	225	CE*	[1993Su16]	Ex,Gos, NR
^{160}Gd	5.24(21)				μ	^{160}Gd		MuonicX-ray	[1983La08]	Ex
^{160}Gd	5.15(6)				α	^{160}Gd	11-17	CE	[1977Ro08,1977Ro26]	NR
^{160}Gd	5.23(8)				α	^{160}Gd	11-13	CE	[1974Sh12]	
^{160}Gd	5.24(10)				α	^{160}Gd	11-13	CE	[1972Er04]	
^{160}Gd			3920(10)		α	^{160}Gd	4-4.5	PB	[1971Sp06]	
^{160}Gd			3880(80)		^{16}O	^{160}Gd	30	DC	[1969Av01]	
^{160}Gd			3870(90)		p	^{160}Gd	3.5	PB	[1968Ri09]	
^{160}Gd			3920(80)		p	^{160}Gd		PB	[1967Wo06]	
^{160}Gd	5.43(40)				^{16}O	^{160}Gd	14-50	CE	[1963Gr04]	
^{160}Gd	5.80(25)				p, d	^{160}Gd	4.5	CE	[1960El07]	
^{160}Gd			3640(200)		p	^{160}Gd	2.8	PB	[1959Bi10]	
^{160}Gd	5.71(25)				p	^{160}Gd	4	CE	[1958Ra12]	
^{160}Gd	6.4(16)							CE	[1956Hu49]	Ex, NR
^{162}Gd			3980(80)					DC	[2010NaZY]	
^{164}Gd			4000(200)					DC	[2010NaZY]	
^{152}Dy			15(8)		^{12}C	^{144}Nd	70	RDM	[1979DuZY]	
^{154}Dy			37.4(15)		^{34}S	^{124}Sn	160	RDM	[1985Az02]	
^{154}Dy			42.3(27)		^{134}Xe	^{25}Mg	686	RDM	[1985Az02]	
^{154}Dy			37.4(15)		^{34}S	^{124}Sn	145-165	RDM	[1982Pa10]	
^{154}Dy			58(29)		^{12}C	^{146}Nd	60	RDM	[1978DuZY]	
^{156}Dy			1060(150)		^{36}S	^{124}Sn	155	RDM	[2006Mo22]	
^{156}Dy	3.72(3)				α	^{156}Dy	12-13	CE	[1977Ro27]	
^{156}Dy			1300(120)					DC	[1970Mo39]	
^{156}Dy			1180(70)					DC	[1966Ab02]	
^{156}Dy	3.79(30)				p, d	^{156}Dy	4	CE	[1963Bj04]	
^{158}Dy	4.67(4)				α	^{158}Dy	12-13	CE	[1977Ro27]	
^{158}Dy			2350(120)					DC	[1970Mo39]	
^{158}Dy			2540(140)					DC	[1968Sc04]	
^{158}Dy			2370(120)					DC	[1966Fu03]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{158}Dy			2450(140)					DC	[1966Ab02]	
^{158}Dy	4.67(40)				p, d	^{158}Dy	4	CE	[1963Bj04]	
^{160}Dy			3160(120)					DC	[1981Is14]	
^{160}Dy			2929(29)					DC	[1972Lo01]	
^{160}Dy			2840(60)					DC	[1971Ab05]	
^{160}Dy			2540(120)					DC	[1970Mo39]	
^{160}Dy			2890(170)					DC	[1969Fo08]	
^{160}Dy			2900(70)					DC	[1968Ku03]	
^{160}Dy			2910(130)					DC	[1966Fu03]	
^{160}Dy			2890(60)					DC	[1965Me08]	
^{160}Dy			2870(60)					DC	[1965Gu02]	
^{160}Dy			2730(70)					DC	[1964Do06]	
^{160}Dy			2971(23)		d	Gd		DC	[1963De21]	
^{160}Dy			2870(70)					DC	[1963Li04]	
^{160}Dy			2770(70)					DC	[1963Fo02]	
^{160}Dy			3230(90)					DC	[1962Ri07]	
^{160}Dy			2450(140)					DC	[1962Be46]	
^{160}Dy	4.46(30)				p, d	^{160}Dy	4.5	CE	[1960El07]	
^{160}Dy			2600(290)					DC	[1952Mc03]	
^{162}Dy	5.2(3)				d	^{162}Dy	12	CE*	[1974ThZG]	NR
^{162}Dy			3050(200)					DC	[1973Ch28]	
^{162}Dy	5.38(5)				α	^{162}Dy	11-13	CE	[1972Er04]	
^{162}Dy	5.39(10)							MuonicX-ray	[1970Hi03]	Ex
^{162}Dy			3160(50)		p	^{162}Dy		PB	[1967Ku07]	
^{162}Dy			2900(300)		^{16}O	^{162}Dy	35	RDM	[1967As03]	
^{162}Dy	4.80(35)				p	^{162}Dy	3	CE	[1963Gr04]	
^{162}Dy			3250(100)					DC	[1963Li04]	
^{162}Dy	4.68(35)				^{16}O	^{162}Dy	8-50	CE	[1963Gr04]	
^{162}Dy	5.0(8)				p, d	^{162}Dy	3.18, 1.8	CE	[1961Go09]	
^{162}Dy	5.11(15)				p, d	^{162}Dy	4.5	CE	[1960El07]	
^{162}Dy			3200(200)		p, d	^{162}Dy	2.8	PB	[1959Bi10]	
^{162}Dy	6.1(15)							CE	[1956Hu49]	Ex, NR
^{164}Dy	5.66(6)				α	^{164}Dy	12	CE	[1974Wo01]	
^{164}Dy	5.59(12)				α	^{164}Dy	11-13	CE	[1974Sh12]	
^{164}Dy	5.55(9)				α	^{164}Dy		CE	[1973Gr05]	Su
^{164}Dy	5.57(5)				α	^{164}Dy	11-13	CE	[1972Er04]	
^{164}Dy	5.48(10)							MuonicX-ray	[1970Hi03]	Ex
^{164}Dy			3460(110)		^{16}O	^{164}Dy	30	DC	[1969Av01]	
^{164}Dy			3444(54)		p	^{164}Dy		PB	[1967Ku07]	
^{164}Dy	5.64(25)				p, d	^{164}Dy	4.5	CE	[1960El07]	
^{164}Dy			3490(350)		p, d	^{164}Dy	2.8	PB	[1959Bi10]	
^{164}Dy	6.1(15)							CE	[1956Hu49]	Ex
^{156}Er			48.3(23)		^{37}Cl	^{123}Sb	158,166	RDM	[1985AzZY]	NR
^{156}Er			50.1(18)		^{40}Ar	^{120}Sn	140-200	RDM	[1979Bo29]	
^{156}Er			47.9(25)		^{40}Ar	^{120}Sn		RDM	[1969Di02]	
^{158}Er			341(10)		^{40}Ar	^{122}Sn	185	RDM	[2002Sh09]	
^{158}Er			371(20)		^{34}S	^{128}Te	155	RDM	[1986Os02]	
^{158}Er			433(22)		^{40}Ar	^{122}Sn		RDM	[1969Di02]	
^{160}Er			1326(45)		^{40}Ar	^{124}Sn	140-200	RDM	[1979Bo29]	
^{160}Er			1230(220)					DC	[1978Ad03]	
^{160}Er			1310(200)		^{40}Ar	^{124}Sn		RDM	[1972Bo04]	
^{160}Er			1330(70)		^{40}Ar	^{124}Sn		RDM	[1969Di02]	
^{162}Er			2200(400)			^{162}Tm(β^+)		DC	[2003Ca03]	
^{162}Er	5.01(3)				α	^{162}Er	12-13	CE	[1977Ro27]	
^{162}Er			1690(140)					DC	[1970Mo39]	
^{162}Er	4.89(25)				p, d	^{162}Er	4	CE	[1963Bj04]	
^{164}Er	5.48(4)				α	^{164}Er	12-13	CE	[1977Ro27]	
^{164}Er			2140(120)					DC	[1970Mo39]	
^{164}Er			2190(90)					DC	[1968Se02]	
^{164}Er			2060(70)					DC	[1963Fo02]	
^{164}Er			2499(46)			^{164}Ho(β^-)		DC	[1963De21]	
^{164}Er	5.04(35)				p, d	^{164}Er	4.5	CE	[1960El07]	
^{164}Er			2020(720)					DC	[1954Br96]	
^{166}Er	5.2(5)				^{32}S, ^{58}Ni	^{166}Er	115,221	CE*	[1992Fa01]	NR
^{166}Er	5.91(6)				α	^{166}Er	11.25-12.00	CE	[1977Fi01]	
^{166}Er	5.80(6)				α	^{166}Er	11-13	CE	[1974Sh12]	
^{166}Er	5.85(5)				α	^{166}Er	12	CE	[1974Wo01]	
^{166}Er			3000(140)					DC	[1973GrXX]	
^{166}Er	5.65(6)				α	^{166}Er	12.5-19.5	CE	[1973Be40,1975Le22]	
^{166}Er	6.04(6)				α	^{166}Er		CE	[1972GrYQ]	
^{166}Er	5.76(10)				α	^{166}Er	11-13	CE	[1972Er04]	
^{166}Er	5.69(16)				^{16}O	^{166}Er	23-35	CE	[1970KaZK]	
^{166}Er			2870(130)					DC	[1970Mo39]	
^{166}Er			2640(70)					DC	[1968Ku03]	
^{166}Er			2680(150)		^{16}O	^{166}Er	35	RDM	[1967As03]	
^{166}Er			2696(42)		p	^{166}Er		PB	[1967Ku07]	
^{166}Er			2640(90)					DC	[1963Li04]	
^{166}Er			2600(70)					DC	[1963Fo02]	
^{166}Er			2532(75)			^{166}Ho(β^-)		DC	[1963De21]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{166}Er			2740(140)					DC	[1962Ba30]	
^{166}Er			2860(300)					DC	[1961Bo05]	
^{166}Er	6.9(12)				p	^{166}Er	3.18, 1.8	CE	[1961Go09]	
^{166}Er			2810(100)					DC	[1961Ge14]	
^{166}Er	5.66(25)				p, d	^{166}Er	4.5	CE	[1960El07]	
^{166}Er			2890(290)					DC	[1960Be28]	
^{166}Er			2610(250)		p	^{166}Er	2.8	PB	[1959Bi10]	
^{166}Er			2886					DC	[1956Be54]	Ex, NR
^{166}Er			2630(90)					DC	[1955Gr07]	
^{166}Er			2450(290)					DC	[1950Mc79]	
^{168}Er	5.90(34)				^{208}Pb, ^{58}Ni	^{168}Er	950, 220	CE*	[1990Ko30]	Ex, Gos, NR
^{168}Er	5.90(10)				α	^{168}Er	12.5-19.5	CE	[1975Le22]	
^{168}Er	6.00(13)				α	^{168}Er	11-13	CE	[1974Sh12]	
^{168}Er			2480(90)					DC	[1974Aw03]	
^{168}Er	5.76(10)				α	^{168}Er	11-13	CE	[1972Er04]	
^{168}Er			2770(29)					DC	[1972BeVM]	
^{168}Er	6.00(12)							MuonicX-ray	[1970Hi03]	Ex
^{168}Er			2710(70)					DC	[1968Ku03]	
^{168}Er			2664(42)		p	^{168}Er		PB	[1967Ku07]	
^{168}Er			2740(140)					DC	[1964Ja09]	
^{168}Er			2740(90)					DC	[1963Li04]	
^{168}Er			2770(60)					DC	[1962Bo18]	
^{168}Er	7.2(12)				p	^{168}Er	3.18, 1.8	CE	[1961Go09]	
^{168}Er	5.72(20)				p, d	^{168}Er	4.5	CE	[1960El07]	
^{168}Er			2650(250)		p	^{168}Er	2.8	PB	[1959Bi10]	
^{168}Er			2600(430)					DC	[1959Be73]	
^{170}Er	$6.71(^{+26}_{-47})$				^{32}S	^{170}Er	117	CE	[2011Di07]	Ex,Gos,NR
^{170}Er	5.81(10)				α	^{170}Er	11-13	CE	[1972Er04]	
^{170}Er	5.97(20)							MuonicX-ray	[1970Hi03]	Ex
^{170}Er			2810(110)		^{16}O	^{170}Er	30	DC	[1969Av01]	
^{170}Er			2710(70)		p	^{170}Er	3.5	PB	[1968Ri09]	
^{170}Er			2734(42)		p	^{170}Er		PB	[1967Ku07]	
^{170}Er	6.13(45)				^{16}O	^{170}Er	14-50	CE	[1963Gr04]	
^{170}Er	5.44(15)				p, d	^{170}Er	4.5	CE	[1960El07]	
^{158}Yb			36.1(43)		^{16}O	^{144}Sm	73	RDM	[1975Tr08]	
^{160}Yb			159(9)		^{116}Cd, ^{48}Ti	^{48}Ti, ^{116}Cd	205, 495	RDM	[1988Fe01]	
^{160}Yb			182(6)		^{40}Ar	^{124}Te	170-190	RDM	[1976Bo27]	
^{162}Yb			618(19)			^{162}Lu(β^+)		DC	[2003Ca03]	
^{162}Yb			577(19)		^{50}Ti	^{116}Cd	215	RDM	[1992Mc02]	
^{162}Yb			613(14)		^{16}O	^{152}Sm	95	RSM	[1979Ri06]	
^{162}Yb			633(53)		^{16}O	^{152}Sm	90	RDM	[1978Ba16]	
^{162}Yb			578(85)		^{40}Ar	^{126}Te	170-190	RDM	[1976Bo27]	
^{164}Yb			1380(100)		^{16}O	^{152}Sm	95	RSM	[1979Ri06]	
^{164}Yb			1401(45)		^{16}O	^{152}Sm	90	RSM	[1978Ba16]	
^{164}Yb			1272(50)		^{40}Ar	^{128}Te	170-190	RDM	[1976Bo27]	
^{166}Yb			1760(100)		^{16}O	^{152}Sm	95	RSM	[1979Ri06]	
^{166}Yb			1789(90)		^{40}Ar	^{130}Te	170-190	RDM	[1976Bo27]	
^{168}Yb			2114(43)					DC	[2015Pa14]	
^{168}Yb			2240(100)		^{16}O	^{152}Sm	95	RSM	[1979Ri06]	
^{168}Yb	5.77(4)				α	^{168}Yb	12-13	CE	[1977Ro27]	
^{168}Yb	5.7(9)				^{16}O	^{168}Yb	60	CE	[1971RiZJ]	
^{168}Yb	5.43(25)				p, d	^{168}Yb	4	CE	[1963Bj04]	
^{170}Yb			2337(29)					DC	[1972Gu03]	
^{170}Yb			2308(29)					DC	[1972Gr05]	
^{170}Yb			2279(43)					DC	[1967Ba27]	
^{170}Yb			2250(120)					DC	[1966Fu03]	
^{170}Yb			2310(70)					DC	[1966Ra04]	
^{170}Yb			2370(70)					DC	[1965Me08]	
^{170}Yb			2280(70)		p	^{170}Yb		PB	[1965Ti02]	
^{170}Yb			2250(70)					DC	[1965Ro17]	
^{170}Yb			2120(60)					DC	[1963Fo02]	
^{170}Yb			2160(290)		γ	^{170}Yb	84	GG	[1962Wa19]	
^{170}Yb			2320(90)					DC	[1962El03]	
^{170}Yb			2340(100)					DC	[1961Go24]	
^{170}Yb	5.53(25)				p, d	^{170}Yb	4.5	CE	[1960El07]	
^{170}Yb			2310(100)					DC	[1959Si74]	
^{170}Yb			2310(140)					DC	[1956De57]	
^{170}Yb			2270(70)					DC	[1952Gr18]	
^{172}Yb	6.0(6)				^{16}O, ^{32}S, ^{58}Ni	^{172}Yb	57, 115, 224	CE*	[1992Fa05]	
^{172}Yb	6.702				μ	^{172}Yb		MuonicX-ray	[1979Ho23]	Ex, NR
^{172}Yb	6.03(6)				α	^{172}Yb	13	CE	[1975Wo08]	
^{172}Yb			2600(70)					DC	[1970Ra18]	
^{172}Yb	5.95(48)				α	^{172}Yb	7, 8, 9, 10	CE	[1970Sa09]	
^{172}Yb			2280(90)					DC	[1969Be34]	
^{172}Yb			2440(60)					DC	[1969FuZX]	
^{172}Yb			2310(160)			^{172}Tm(β^-)		DC	[1969Fo07]	
^{172}Yb			2410(115)			^{172}Lu(β^+)		DC	[1969Fo07]	
^{172}Yb			2300(600)					DC	[1968Ka01]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{172}Yb			2460(70)		p	^{172}Yb		PB	[1966Ti01]	
^{172}Yb			2270(60)					DC	[1964Gu01]	
^{172}Yb			2160(140)					DC	[1963He01]	
^{172}Yb			2400(200)		α	^{172}Yb	3	PB	[1962Bi05]	
^{172}Yb	5.89(20)				p, d	^{172}Yb	4.5	CE	[1960El07]	
^{174}Yb	5.95(6)				α	^{174}Yb	13	CE	[1975Wo08]	
^{174}Yb	5.97(6)				α	^{174}Yb	11-13	CE	[1974Sh12]	
^{174}Yb	5.89(47)				α	^{174}Yb	7, 8, 9, 10	CE	[1970Sa09]	
^{174}Yb			2597(144)			^{174}Lu(EC)		DC	[1966Ja16]	NR
^{174}Yb			2590(70)		p	^{174}Yb		PB	[1966Ti01]	
^{174}Yb			2510(130)					DC	[1966Fu03]	
^{174}Yb			2600(140)					DC	[1964Ja09]	
^{174}Yb	5.54(30)				p, d	^{174}Yb	4	CE	[1963Bj04]	
^{174}Yb			2750(300)		α	^{174}Yb	3	PB	[1962Bi05]	
^{174}Yb	5.89(20)				p, d	^{174}Yb	4.5	CE	[1960El07]	
^{176}Yb	5.41(9)				α	^{176}Yb	13	CE	[1975Wo08]	
^{176}Yb			2720(50)		α	^{176}Yb	4-4.5	PB	[1971Sp06]	
^{176}Yb	5.35(43)				α	^{176}Yb	7, 8, 9, 10	CE	[1970Sa09]	
^{176}Yb			2540(70)		p	^{176}Yb		PB	[1966Ti01]	
^{176}Yb	5.28(40)				^{16}O	^{176}Yb	14-50	CE	[1963Gr04]	
^{176}Yb			2900(200)		α	^{176}Yb	3	PB	[1962Bi05]	
^{176}Yb	5.2(8)				p	^{176}Yb	3.18, 1.8	CE	[1961Go09]	
^{176}Yb	5.78(20)				p, d	^{176}Yb	4.5	CE	[1960El07]	
^{162}Hf			148(11)		^{40}Ca	^{126}Te	175	RDM	[1998We02]	
^{164}Hf			497(29)		^{40}Ca	^{128}Te	175	RDM	[1998We02]	
^{164}Hf			370(30)		^{20}Ne	^{148}Sm	117	RDM	[1989Mu13]	
^{166}Hf			717(33)		^{48}Ti	^{122}Sn	195	RDM	[1977Bo14]	
^{168}Hf			1237(10)					DC	[2011We08]	
^{168}Hf			1278(54)		^{48}Ti	^{124}Sn	195	RDM	[1977Bo14]	
^{170}Hf			1740(60)		^{16}O	^{158}Gd	80	PB	[2006Co20]	
^{170}Hf			1771(396)		^{50}Ti	^{124}Sn	198	RDM	[1977Bo14]	
^{172}Hf			1803(58)					DC	[2015Ru03]	
^{172}Hf			1700(20)					DC	[2011ReZZ]	
^{172}Hf			2655(79)					DC	[2010We12]	Ex
^{172}Hf			2240(140)					DC	[1967Ab06]	Ex
^{174}Hf			1847(58)					DC	[2015Ru03]	
^{174}Hf			1797(10)		α	^{172}Yb	27	DC	[2009Re20]	
^{174}Hf	5.35(35)				α	^{174}Hf	15	CE	[1971Ej01]	
^{174}Hf			2420(120)					DC	[1971Ch26]	
^{174}Hf			2370(140)					DC	[1965Ab02]	
^{174}Hf	5.26(35)				p, d	^{174}Hf	4	CE	[1963Bj04]	
^{176}Hf	5.29(10)				μ	^{176}Hf	120 MeV/c	MuonicX-ray	[1984Ta10]	Ex
^{176}Hf	5.19(5)				α	^{176}Hf	11-17	CE	[1977Ro08,1977Ro26]	NR
^{176}Hf	5.78(23)				α	^{176}Hf	15	CE	[1973Ha07]	
^{176}Hf			2010(60)					DC	[1963Fo02]	
^{176}Hf			2121(87)					DC	[2015Ru03]	
^{176}Hf	5.27(25)				p, d	^{176}Hf	4.5	CE	[1961Ha21]	
^{178}Hf	4.91(10)				μ	^{178}Hf	120 MeV/c	MuonicX-ray	[1984Ta10]	Ex
^{178}Hf	4.86(5)				α	^{178}Hf	11-17	CE	[1977Ro08,1977Ro26]	NR
^{178}Hf			2160(140)					DC	[1967Ab06]	
^{178}Hf	4.51(20)				p, d	^{178}Hf	4	CE	[1963Bj04]	
^{178}Hf			2120(90)					DC	[1963Fo02]	
^{178}Hf			2164(43)					DC	[1962Ka14]	
^{178}Hf			2150(70)					DC	[1962Bo13]	
^{178}Hf	4.3(7)				p	Hf	3.18, 1.8	CE	[1961Go09]	
^{178}Hf			1800(120)					DC	[1961Ga05]	
^{178}Hf	4.66(25)				p, d	^{178}Hf	4.5	CE*	[1961Ha21]	NR
^{178}Hf			2700(150)		p	^{178}Hf	2.8	PB	[1959Bi10]	
^{180}Hf			2204(14)					DC	[1996Al20]	
^{180}Hf	4.78(10)				μ	^{180}Hf	120 MeV/c	MuonicX-ray	[1984Ta10]	Ex
^{180}Hf	4.73(5)				α	^{180}Hf	11-17	CE	[1977Ro08,1977Ro26]	NR
^{180}Hf			2210(70)					DC	[1963Li04]	
^{180}Hf	4.93(35)				^{16}O	^{180}Hf	14-50	CE	[1963Gr04]	
^{180}Hf			2160(60)					DC	[1962Fo05]	
^{180}Hf	4.35(20)				p, d	^{180}Hf	4.5	CE	[1961Ha21]	
^{180}Hf	4.3(7)				p	Hf	3.18, 1.8	CE	[1961Go09]	
^{180}Hf			2210(90)					DC	[1961Bo25]	
^{180}Hf			2136(72)					DC?	[1960De18]	NR
^{180}Hf			2380(150)		p	^{180}Hf	2.8	PB	[1959Bi10]	
^{180}Hf	6.9(115)							CE	[1956Hu49]	Ex, NR
^{180}Hf			2020(140)					DC	[1955Su64]	
^{168}W			307(15)		^{31}P	^{141}Pr	158	RDM	[1984Dr02]	
^{170}W			720(150)		^{52}Cr	^{122}Sn	230	TDSA	[1994Mc06]	
^{170}W			718(14)		^{20}Ne	^{155}Gd	105	RDM	[1980Mi16]	
^{172}W			970(29)		^{16}O	^{160}Dy	85	DC	[2010Ru12]	
^{172}W			1061(93)		^{52}Cr	^{124}Sn	225	RDM	[1991Mc04]	
^{172}W			890(60)		^{52}Cr	^{124}Sn	225	RDM	[1986Ra07]	Su
^{174}W			1339(8)					DC	[2011We08]	
^{174}W			1650(100)		^{19}F	^{159}Tb	85	RDM	[1987Ga14]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{176}W			1431(9)		^{11}B	^{169}Tm	55	DC	[2009Re20]	
^{178}W			1642(21)		^{12}C	^{170}Er	62	DC	[2010Ru12]	
^{180}W			1976(43)					DC	[1965Hu02]	
^{180}W			1718(53)			^{180}Ta(β^-)		DC	[1963De21]	
^{180}W			1760(40)					DC	[1963Cu03]	
^{180}W			1920(70)					DC	[1962Fo05]	
^{182}W			2185(90)		^{58}Ni, ^{136}Xe	^{182}W	233,561	RDM	[1991Wu05]	NR
^{182}W	3.76(16)				^{58}Ni, ^{136}Xe	^{182}W	233,561	CE*	[1991Wu05]	NR
^{182}W	5.02(54)				^{208}Pb	^{182}W	4.9A	CE*	[1989Ku04]	
^{182}W	4.08(24)				^{136}Xe, ^{58}Ni	^{182}W	561, 235	CE*	[1989Wu04]	Su
^{182}W	4.140(40)				e	^{182}W	75-345	EE	[1988PeZW]	
^{182}W			1991(43)					DC	[1983El02]	
^{182}W			2240(70)					DC	[1973GrXX]	
^{182}W	4.21(7)				α	^{182}W	13-21	CE	[1973Be40,1975Le22]	
^{182}W			1991(29)					DC	[1971Ho14]	
^{182}W	4.29(12)							MuonicX-ray	[1970Hi03]	Ex
^{182}W			2135(43)					DC	[1970Ab14]	
^{182}W	4.30(8)				α	^{182}W	8	CE	[1968St13]	
^{182}W			2060(70)					DC	[1966Ra04]	
^{182}W			1950(100)					DC	[1966Fu03]	
^{182}W			2090(60)					DC	[1966Bl08]	
^{182}W			1976(43)					DC	[1965Me08]	
^{182}W			2005(43)					DC	[1965Do02]	
^{182}W			2120(130)					DC	[1964Ro19]	
^{182}W			2020(140)					DC	[1964Be36]	
^{182}W			1980(20)		p	^{182}W	2.04	PB	[1964Sc21]	
^{182}W	4.58(40)				^{16}O	^{182}W	14-50	CE	[1963Gr04]	
^{182}W			1820(60)					DC	[1963Fo02]	
^{182}W			2240(160)					DC	[1963Ba24]	
^{182}W			2030(90)					DC	[1963Ko02]	
^{182}W			2060(60)		α	^{182}W	3	PB	[1962Bi05]	
^{182}W	4.00(20)				p, d	^{182}W	4.5	CE	[1961Ha21]	
^{182}W			1971(20)			^{182}Ta(β^-)		DC	[1961Ke07]	NR
^{182}W			2230(200)		p	^{182}W	2.8	PB	[1959Bi10]	Su
^{182}W	5.5(14)							CE	[1956Hu49]	Ex, NR
^{182}W	4.47(54)				p	^{182}W	4	CE	[1958Mc02]	
^{182}W			1830(140)					DC	[1954Su10]	
^{184}W			1869(79)		^{58}Ni, ^{136}Xe	^{182}W	233,561	RDM	[1991Wu05]	NR
^{184}W	3.57(15)				^{58}Ni, ^{136}Xe	^{182}W	233,561	CE*	[1991Wu05]	NR
^{184}W	3.88(20)				^{136}Xe, ^{58}Ni	^{184}W	561, 235	CE*	[1989Wu04]	Su
^{184}W	4.49(47)				^{208}Pb	^{184}W	4.9A	CE*	[1989Ku04]	
^{184}W	3.690(40)				e	^{184}W	75-345	EE	[1988PeZW]	
^{184}W			1804(17)					DC	[1984Al06]	
^{184}W	3.76(8)				α	^{184}W	12.5-19	CE	[1975Le22]	
^{184}W	3.67(37)		1860(170)		γ	^{184}W	111	Mossbauer	[1971Ob02]	Ex
^{184}W	3.70(40)		1850(190)		γ	^{184}W	111	Mossbauer	[1970Me09]	Ex, Su
^{184}W	3.91(10)		1730(60)					MuonicX-ray	[1970Hi03]	Ex
^{184}W	3.84(7)				α	^{184}W	8	CE	[1968St13]	
^{184}W			1760(130)		^{16}O	^{184}W	35	RDM	[1967As03]	
^{184}W			1850(30)		p	^{184}W	2	PB	[1965Sc05]	
^{184}W			1790(60)					DC	[1964Ko13]	
^{184}W	4.18(30)				^{16}O	^{184}W	14-50	CE	[1963Gr04]	
^{184}W			1790(50)		α	^{184}W	3	PB	[1962Bi05]	
^{184}W			1970(20)					DC	[1961KeZZ]	
^{184}W	3.62(20)				p, d	^{184}W	4.5	CE	[1961Ha21]	
^{184}W			1850(120)					DC	[1960Bo07]	
^{184}W			1920(150)		p	^{184}W	2.8	PB	[1959Bi10]	Su
^{184}W	4.37(44)				p	^{184}W	4	CE	[1958Mc02]	
^{184}W	4(1)							CE	[1956Hu49]	NR
^{186}W	3.42(33)				^{208}Pb	^{186}W	4.9A	CE*	[1989Ku04]	
^{186}W	3.35(8)				α	^{186}W	13.25-19	CE	[1975Le22]	
^{186}W			1495(14)					DC	[1975Ka11]	
^{186}W	3.37(80)				α	^{186}W	11-20	CE	[1974Br31]	
^{186}W	2.71(25)		2010(170)		γ	^{186}W	122	Mossbauer	[1971Ob02]	Ex
^{186}W	2.73(26)		1990(170)		γ	^{186}W	122	Mossbauer	[1970Me09]	Ex, Su
^{186}W	3.46(12)		1560(70)					MuonicX-ray	[1970Hi03]	Ex
^{186}W	3.50(6)				α	^{186}W	8	CE	[1968St13]	
^{186}W			1870(300)		^{16}O	^{186}W	35	RDM	[1967As03]	
^{186}W			1610(30)		p	^{186}W		PB	[1967Ku07]	
^{186}W			1460(60)		α	^{186}W	3	PB	[1962Bi05]	
^{186}W	3.57(25)				p, d	^{186}W	4.5	CE	[1961Ha21]	
^{186}W	3.56(37)				p	^{186}W	4	CE	[1961Mc01,1958Mc02]	
^{186}W			1610(100)		p	^{186}W	2.8	PB	[1959Bi10]	Su
^{186}W	3.80(95)							CE	[1956Hu49]	NR
^{188}W			1255(173)					Fast-Timing	[2013Ma66]	
^{172}Os			167(10)		^{32}S	^{144}Nd	162	RDM	[1995Vi05]	
^{174}Os			513(20)		^{28}Si	^{150}Sm	140	DC	[2012Li50]	
^{174}Os			505(60)		^{127}I	^{51}V	610	RDM	[1987Ga12]	
^{176}Os			1210(180)		^{16}O	^{164}Er	80	DC	[2005Mo33]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{178}Os			1050(100)		^{16}O	^{166}Er	80	DC	[2005Mo33]	
^{178}Os			940(90)		^{16}O	^{166}Er	80	RDM	[2005Mo33]	
^{180}Os			970(100)		^{16}O	^{168}Er	80	DC	[2005Mo33]	
^{180}Os			1160($^{+300}_{-200}$)		^{34}S	^{150}Nd	157	RDM	[1990Ka11]	
^{182}Os			1370(140)			^{182}Ir(EC)		DC	[1972HuZL]	NR
^{182}Os			1370(140)					DC	[1970ErZY]	Su
^{182}Os			1173(16)					DC	[1970BrZP]	
^{184}Os	3.20(62)				α; ^{16}O; ^{32}S	^{184}Os	10, 12, 14; 36, 42, 48; 48, 52, 56	CE	[1972La16]	
^{184}Os			1708(19)					DC	[1971Bb09]	
^{184}Os			1529(43)					DC	[1970BrZP]	
^{184}Os			1700(70)					DC	[1970Be18]	
^{184}Os			1590(70)					DC	[1970ErZY]	
^{186}Os	2.80($^{+8}_{-7}$)				^{40}Ca, ^{58}Ni, ^{136}Xe, ^{208}Pb	^{186}Os	3.3-4.8A	CE*	[1996Wu07]	
^{186}Os	3.15(3)				μ	^{186}Os		MuonicX-ray	[1981Ho22]	Ex, MD, NR
^{186}Os	3.10(25)				α	^{186}Os	13	CE	[1976Ba06]	
^{186}Os	2.88(39)				α, ^{16}O, ^{32}S	^{186}Os	10, 12, 14; 36, 42, 48; 48, 52, 56	CE	[1972La16]	
^{186}Os	3.21(28)				α	^{186}Os	3-5	CE	[1971Mi08]	
^{186}Os			1332(26)					DC	[1971Bb09]	
^{186}Os			1210(70)					DC	[1970Be18]	
^{186}Os			1169(43)					DC	[1968Ma14]	
^{186}Os	2.95(40)				^{16}O	^{186}Os	35.4	CE	[1967Gi02]	Ex
^{186}Os	3.10(40)				^{16}O	^{186}Os	48.3, 62.1, 70.3	CE	[1967Ca08]	
^{186}Os			1219(29)					DC	[1964Ro19]	
^{186}Os			1183(43)					DC	[1963Fo02]	
^{186}Os			1260(60)					DC	[1962Ba14]	
^{186}Os			1212(43)					DC	[1961Bo08]	
^{186}Os	4.3(11)				α, p	Os	3.5, 4.8	CE	[1961Re02]	
^{186}Os			870(290)					DC	[1957Be73]	
^{186}Os			2600(580)					DC	[1953Mc39]	
^{186}Os			1150(140)					DC	[1951Mc14]	
^{188}Os			930(140)		^{58}Ni	^{188}Os	275	RDM	[2001Wu03]	
^{188}Os			1030(50)		^{188}Os	C	270	DC	[1997Bb08]	
^{188}Os	2.512(32)				^{40}Ca, ^{58}Ni, ^{136}Xe, ^{208}Pb	^{188}Os	3.3-4.8A	CE*	[1996Wu07]	
^{188}Os	2.635(30)				e	^{188}Os	200, 500	EE	[1988Bo08]	
^{188}Os	2.82(3)				μ	^{188}Os		MuonicX-ray	[1981Ho22]	Ex, MD, NR
^{188}Os	2.52(13)				α	^{188}Os	13	CE	[1976Ba06]	
^{188}Os	2.69(27)				α, ^{16}O, ^{32}S	^{188}Os	10, 12, 14; 36, 42, 48; 48, 52, 56	CE	[1972La16]	
^{188}Os	2.78(15)				p	^{188}Os	4.56-5.08	CE	[1971Mi08]	
^{188}Os			1030(30)					DC	[1971Bo13]	
^{188}Os			1036(25)					DC	[1971Bb09]	
^{188}Os	2.90(8)				α, ^{16}O	^{188}Os	10-13; 42, 47	CE	[1970Pr09]	
^{188}Os			1024(43)					DC	[1970Be18]	
^{188}Os			981(43)					DC	[1968Ma14]	
^{188}Os	2.70(40)				^{16}O	^{188}Os	48.3, 62.1, 70.3	CE	[1967Ca08]	
^{188}Os			1020(50)		^{16}O	^{188}Os	35	RDM	[1966As03]	
^{188}Os			1024(29)					DC	[1963Fo02]	
^{188}Os	2.43(24)				p	^{188}Os	2	CE	[1963Go05]	Ex
^{188}Os			1050(90)					DC	[1962Ba14]	
^{188}Os	3.7(5)				α, p	Os	3.5, 4.8	CE	[1961Re02]	
^{188}Os	3.17(33)							CE	[1961Mc18]	Rad
^{188}Os	2.80(31)				α, p	Os		CE	[1958Mc02,1961Mc01]	
^{188}Os	3.5(10)				α	^{188}Os	3	CE	[1957Ba11]	
^{188}Os			940(220)					DC	[1955Su64]	
^{188}Os			2450(280)					DC	[1953Mc39]	
^{190}Os			541(29)					Fast-Timing	[2012MaZP]	
^{190}Os			540(36)		^{58}Ni	^{190}Os	275	RDM	[2001Wu03]	
^{190}Os	2.355(48)				^{40}Ca, ^{58}Ni, ^{136}Xe, ^{208}Pb	^{190}Os	3.3-4.8A	CE*	[1996Wu07]	
^{190}Os	2.315(27)				e	^{190}Os	200, 500	EE	[1988Bo08]	
^{190}Os	2.46(2)				μ	^{190}Os		MuonicX-ray	[1981Ho22]	Ex, MD, NR
^{190}Os	2.14(11)				α	^{190}Os	13	CE	[1976Ba06]	
^{190}Os	2.48(25)				α, ^{16}O, ^{32}S	^{190}Os	10, 12, 14; 36, 42, 48; 48, 52, 56	CE	[1972La16]	
^{190}Os	2.37(13)				p	^{190}Os	4.56-5.08	CE	[1971Mi08]	
^{190}Os	2.39(6)				α, ^{16}O	^{190}Os	12, 42	CE	[1970Pr09]	
^{190}Os	2.55(25)				^{16}O	^{190}Os	42-80	CE	[1969Ca19]	NR
^{190}Os			680(30)		^{16}O	^{190}Os		RDM	[1967As03]	
^{190}Os	3.38(40)				α, p	Os	3.5, 4.8	CE	[1961Re02]	
^{190}Os	2.70(27)							CE	[1961Mc18]	Rad
^{190}Os			350(60)					DC	[1958Su54]	
^{190}Os	2.55(26)				α, p	Os		CE	[1958Mc02,1961Mc01]	
^{190}Os			720(290)					DC	[1958Be72]	
^{190}Os	2.5(7)				α	^{190}Os	3	CE	[1957Ba11]	
^{192}Os	1.97(16)				^{192}Os	C	270	CE*	[1997Bb08]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{192}Os	2.119(25)				^{40}Ca, ^{58}Ni, ^{136}Xe, ^{208}Pb	^{192}Os	3.3-4.8A	CE*	[1996Wu07]	
^{192}Os	2.030(13)				α, ^{12}C	^{192}Os	14.190-16.497, 40-55	CE	[1988Li22]	
^{192}Os	1.999(23)				e	^{192}Os	200, 500	EE	[1988Bo08]	
^{192}Os	2.009(32)				e	^{192}Os	150, 250, 355, 364	EE	[1984Re10]	
^{192}Os	2.10(2)				μ	^{192}Os		MuonicX-ray	[1981Ho22]	Ex, MD, NR
^{192}Os	1.90(9)				α	^{192}Os	13	CE	[1976Ba06]	
^{192}Os			433(29)					DC	[1973Ch26]	
^{192}Os	2.09(21)				α, ^{16}O, ^{32}S	^{192}Os	10, 12, 14; 36, 42, 48; 48, 52, 56	CE	[1972La16]	
^{192}Os	1.99(11)				p	^{192}Os	4.56-5.08	CE	[1971Mi08]	
^{192}Os	2.04(6)				α, ^{16}O	^{192}Os	12; 42,52.5	CE	[1970Pr09]	
^{192}Os	2.21(22)				^{16}O	^{192}Os	42-80	CE	[1969Ca19]	NR
^{192}Os	1.92(25)				^{16}O	^{192}Os	35.4	CE	[1967Gi02]	Ex
^{192}Os	2.92(40)				α, p	Os	3.5, 4.8	CE	[1961Re02]	
^{192}Os	2.32(23)							CE	[1961Mc18]	Rad
^{192}Os	2.05(21)				α, p	Os		CE	[1958Mc02,1961Mc01]	
^{192}Os	2.1(6)				α	^{192}Os	3	CE	[1957Ba11]	
^{176}Pt			109(10)		^{35}Cl	^{144}Sm	173	RDM	[1986Dr05]	
^{178}Pt			412(30)		^{28}Si	^{154}Gd	146	DC	[2014Li45]	
^{180}Pt			540(50)		^{40}Ar	^{144}Nd	192	RDM	[1990De04]	
^{182}Pt			590(102)		^{16}O	^{170}Yb	87	RDM	[2012Gl01]	
^{182}Pt			709(43)		^{64}Ni	^{122}Sn	295	RDM	[2012Wa16]	
^{184}Pt			582(22)		^{34}S	^{154}Sm	160	RDM	[1986Ga21]	
^{184}Pt			519(17)					DC	[1972Fi12]	
^{186}Pt			318(24)		^{36}S	^{154}Sm	167	RDM	[2012Wa16]	
^{186}Pt			369(35)		^{36}S	^{154}Sm		RDM	[1990WeZZ]	Su
^{186}Pt			375(14)					DC	[1972Fi12]	
^{188}Pt			104(19)					DC	[1972Fi12]	
^{190}Pt	1.82(9)				^{58}Ni	^{190}Pt	160	CE	[1995An15]	NR
^{190}Pt			65(22)					DC	[1972Fi12]	
^{190}Pt	1.75(22)				^{16}O	^{190}Pt	36	CE	[1966Gr20]	Rad
^{192}Pt	1.833(20)				α, ^{12}C, ^{16}O	^{192}Pt	14.4-15.2, 41-48, 55-60	CE	[1987Gy01]	
^{192}Pt	1.81(9)				α, p	Pt	5-6	CE	[1984Mu19]	Ex
^{192}Pt	1.89(3)				α	^{192}Pt	14.9	CE	[1977Ro16]	
^{192}Pt			70.0(36)		^{40}Ar	^{192}Pt	149	RDM	[1977Jo05]	
^{192}Pt			51(5)					DC	[1976Bu20]	
^{192}Pt			61.7(21)					DC	[1973Sm01]	
^{192}Pt	2.10(12)				p, ^{16}O	^{192}Pt	4.5, 43.75	CE	[1971Mi08]	
^{192}Pt			49(7)					DC	[1970Be08]	
^{192}Pt	2.000(40)				α, ^{16}O	Pt	10, 15; 41	CE	[1970Br26]	Ex
^{192}Pt			51(4)					DC	[1966Sc06]	
^{192}Pt	1.95(23)				^{16}O	^{192}Pt	36	CE	[1966Gr20]	Rad
^{192}Pt			39(5)					DC	[1962De14]	NR
^{194}Pt	1.46($^{+12}_{-4}$)				^{40}Ca, ^{58}Ni, ^{136}Xe, ^{208}Pb	^{194}Pt	3.3-4.8A	CE*	[1996Wu07]	
^{194}Pt	1.636(48)				e	^{194}Pt	200, 500	EE	[1988Bo08]	
^{194}Pt	1.661(11)				α, ^{12}C, ^{16}O	^{194}Pt	14-18.6, 41-45, 55-63	CE	[1986Gy04]	
^{194}Pt			69.6(44)		^{32}S	Pt	100	RDM	[1986Bi13]	
^{194}Pt	1.620(15)				α, ^{16}O	^{194}Pt	7-17.5; 46, 54	CE	[1978Ba38]	
^{194}Pt	1.68(3)				α	^{194}Pt	14.9	CE	[1977Ro16]	
^{194}Pt			64.9(35)		^{40}Ar	^{194}Pt	149	RDM	[1977Jo05]	
^{194}Pt	1.67(13)				α	^{194}Pt	12-24	CE	[1976Ba23]	
^{194}Pt			51(7)		γ	^{194}Pt	0.7-1.8	GG	[1972Sh38]	
^{194}Pt			50(5)					DC	[1972Be53]	
^{194}Pt			73.0(30)					RDM	[1971NoZT]	
^{194}Pt	1.87(9)				p, ^{16}O	^{194}Pt	4.5, 43.76	CE	[1971Mi08]	
^{194}Pt	1.64(4)				p, ^{16}O	^{194}Pt	6, 42	CE	[1969Gl08]	
^{194}Pt	1.94(20)				p	Pt	4-5	CE	[1961Mc01]	
^{196}Pt			50(6)		n	^{196}Pt	cold	TCS	[2015Jo01]	
^{196}Pt	1.368(3)				α, ^{7}Li, ^{12}C	^{196}Pt	14.2-15.8, 22.0-22.5, 42-46	CE	[1992Li14]	
^{196}Pt	1.49(21)				e	^{196}Pt	90-334	EE	[1992Po09]	NR
^{196}Pt	1.422(36)				e	^{196}Pt	200, 500	EE	[1988Bo08]	
^{196}Pt	1.382(6)				α, ^{12}C, ^{16}O	^{196}Pt	14-18.6, 41-45, 55-63	CE	[1986Gy04]	
^{196}Pt			54.5(37)		^{32}S	Pt	100	RDM	[1986Bi13]	
^{196}Pt	1.382(6)				^{16}O, ^{12}C	^{196}Pt	55-61, 41-56	CE	[1985Fe03]	
^{196}Pt	1.42(7)				α, p	Pt	5-6	CE	[1984Mu19]	Ex
^{196}Pt			46.5(21)		^{58}Ni	^{196}Pt	220	RDM	[1981Bo32]	
^{196}Pt			50.8(22)		^{20}Ne, ^{58}Ni	^{196}Pt	90, 220	RDM	[1979Bo31]	
^{196}Pt	1.36(11)				α	^{196}Pt	14-24	CE	[1976Ba35]	
^{196}Pt			43.6(30)					DC	[1972Be53]	
^{196}Pt	1.55(8)				p, ^{16}O	^{196}Pt	4.5, 43.75	CE	[1971Mi08]	
^{196}Pt			51(5)					RDM	[1971NoZT]	
^{196}Pt	1.350(40)				α, ^{16}O	Pt	10, 15; 41	CE	[1970Br26]	Ex
^{196}Pt	1.49(5)				^{16}O	^{196}Pt	42	CE	[1969Gl08]	
^{196}Pt	1.39(15)				^{16}O	^{196}Pt	33	CE	[1967Ka16]	Ex
^{196}Pt	1.34(17)				^{16}O	^{196}Pt	36	CE	[1966Gr20]	Rad

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{196}Pt	1.27(13)				p	Pt	4-5	CE	[1961Mc01]	
^{198}Pt	1.090(7)				α, ^{12}C, ^{16}O	^{198}Pt	14-18.6, 41-45, 55-63	CE	[1986Gy04]	
^{198}Pt	1.08(5)				α, p	Pt	5-6	CE	[1984Mu19]	Ex
^{198}Pt			35.1(30)		^{58}Ni	^{198}Pt	220	RDM	[1981Bo32]	
^{198}Pt			33.6(16)					RDM	[1980Ke04]	
^{198}Pt	1.16(9)				α	^{198}Pt	14-24	CE	[1976Ba35]	
^{198}Pt	1.17(5)				p, ^{16}O	^{198}Pt	4.5, 43.75	CE	[1971Mi08]	
^{198}Pt	0.980(30)				α, ^{16}O	Pt	10, 15, 41	CE	[1970Br26]	Ex
^{198}Pt	1.01(5)				^{16}O	^{198}Pt	42	CE	[1969Gl08]	
^{198}Pt	1.04(16)				^{16}O	^{198}Pt	36	CE	[1966Gr20]	Ex
^{198}Pt	1.49(16)				p	Pt	5	CE	[1955St57]	Rad
^{180}Hg			17.5(25)		^{88}Sr	^{94}Mo	300	RDM	[2009Gr09]	
^{182}Hg	$1.66(^{+11}_{-7})$				^{182}Hg	^{107}Ag	2.85A	CE	[2014Br05]	
^{182}Hg			42.1(23)		^{88}Sr	^{96}Mo	300	RDM	[2010Sc03]	
^{182}Hg			41(3)		^{88}Sr	^{96}Mo	300	RDM	[2009Gr09]	Su
^{184}Hg	$1.61(^{+8}_{-7})$				^{184}Hg	^{112}Cd	2.85A	CE	[2014Br05]	
^{184}Hg			35.7(15)		^{40}Ar	^{148}Sm	200	RDM	[2014Ga04]	
^{184}Hg			30(7)		^{32}S	^{156}Gd	156	RDM	[1973Ru08]	
^{186}Hg	$1.56(^{+26}_{-17})$				^{186}Hg	^{114}Cd	2.85A	CE	[2014Br05]	
^{186}Hg			24(3)		^{40}Ar	^{160}Sm	195	RDM	[2014Ga04]	
^{186}Hg			20(25)					DC	[1994Jo13]	Ex, NR
^{186}Hg			26.0(43)		^{20}Ne	^{170}Yb	108	RDM	[1974Pr02]	
^{188}Hg	$1.72(^{+27}_{-26})$				^{188}Hg	^{120}Sn	2.85A	CE	[2014Br05]	
^{196}Hg	1.12(2)				α, ^{16}O	196Hg	13-16, 56-60	CE	[1979Bo16]	
^{196}Hg			19.6(29)			^{196}Au(β^-)		DC	[1963De21]	
^{198}Hg	0.991(6)				α, ^{16}O	^{198}Hg	13-16, 56-60	CE	[1979Bo16]	
^{198}Hg	0.961(6)				α, ^{12}C, ^{16}O	^{198}Hg	14.1-18, 43-54, 60-80	CE	[1977Es02,1984Fe08]	NR
^{198}Hg			31.7(14)					DC	[1974Bu13]	
^{198}Hg			22.0(12)					DC	[1970BaYH]	
^{198}Hg	0.880(30)							CE	[1969GlZY]	
^{198}Hg			38.9(39)					DC	[1968Ra32]	
^{198}Hg			28.9(43)					DC	[1967Be62]	
^{198}Hg			36(7)					DC	[1966Go20]	
^{198}Hg			49.0(30)		γ	^{198}Hg	0.412	GG	[1963Fr05]	
^{198}Hg			35(5)					DC	[1961Si01]	
^{198}Hg			30(10)					DC	[1958Su57]	
^{198}Hg	1.13(34)				p	^{198}Hg	4.5	CE	[1956Ba45]	
^{198}Hg			31.5(30)		γ	^{198}Hg	0.411	GG	[1954Me55]	
^{198}Hg			32(7)		γ	^{198}Hg	0.412	GG	[1953Da23]	
^{200}Hg	0.853(7)				α, ^{12}C, ^{16}O	^{200}Hg	13.5-16.5, 40-60, 59-65	CE	[1980Sp05]	
^{200}Hg	0.853(15)				α, ^{16}O	^{200}Hg	13-16, 56-60	CE	[1979Bo16]	
^{200}Hg	0.80(10)				^{16}O	^{200}Hg	33	CE	[1971Ka03]	
^{200}Hg	0.95(11)				^{16}O	^{200}Hg	33-38	CE	[1970Ka09]	
^{200}Hg	0.85(26)				p	^{200}Hg	4.5	CE	[1956Ba45]	
^{202}Hg	0.605(5)				α, ^{12}C, ^{16}O	^{202}Hg	13.5-16.5, 40-60, 59-65	CE	[1980Sp05]	
^{202}Hg	0.616(9)				α, ^{16}O	^{202}Hg	13-16, 56-60	CE	[1979Bo16]	
^{202}Hg	0.65(8)				^{16}O	^{202}Hg	33-38	CE	[1970Ka09]	
^{202}Hg	0.59(18)				p	^{202}Hg	4.5	CE	[1956Ba45]	
^{202}Hg			34(7)		γ	^{202}Hg	440	GG	[1955Me35]	
^{204}Hg	0.429(4)				e	^{204}Hg	83-477	EE	[1989BuZP]	NR
^{204}Hg	0.423(5)				α, ^{12}C, ^{16}O	^{204}Hg	13.5-16.5, 45-56; 63, 65	CE	[1981Es03]	
^{204}Hg	0.427(6)				α, ^{16}O	^{204}Hg	13-16, 56-60	CE	[1979Bo16]	
^{204}Hg	0.475(23)				α	^{204}Hg	15-18	CE	[1971FoZW]	
^{204}Hg	0.37(4)				^{16}O	^{204}Hg	33-38	CE	[1970Ka09]	
^{204}Hg	0.20(10)							CE	[1956Ba45]	
^{206}Hg			<30000		t	^{204}Hg	16	DC	[1982Be38]	NR
^{186}Pb			18(5)		^{83}Kr	^{106}Pd	340, 357, 375	RDM	[2008Gr04]	
^{186}Pb			18(5)		^{83}Kr	^{106}Pd	340, 357, 375	RDM	[2006Gr16]	Su
^{188}Pb			8.5(35)		^{83}Kr	^{108}Pd	340, 357, 375	RDM	[2008Gr04]	
^{188}Pb			8.5(35)		^{83}Kr	^{108}Pd	340, 357, 375	RDM	[2006Gr16]	Su
^{188}Pb			13(7)		^{152}Sm	^{40}Ca	805	RDM	[2003De24]	
^{202}Pb			<144.3		p	Tl	50	DC	[1959Jo21]	ENSDF, NR
^{204}Pb	0.174(18)				e	^{204}Pb	52-502	EE	[1984Pa02]	
^{204}Pb	0.166(2)				α, ^{12}C, ^{16}O	^{204}Pb	13.8-18.5, 44-60, 59-85	CE	[1978Jo04]	
^{204}Pb	0.166(9)				^{32}S	^{204}Pb	100, 112.5, 125	CE	[1974Ol02]	
^{204}Pb	0.151(15)				α, ^{16}O	^{204}Pb	15-18, 69-80	CE	[1972Ha59]	
^{204}Pb	0.146(15)				α, ^{16}O	^{204}Pb	15, 18; 70, 80	CE	[1971Gr31]	
^{206}Pb	0.096(10)				e	^{206}Pb	52-502	EE	[1984Pa02]	
^{206}Pb	0.1030(10)				α, ^{12}C, ^{16}O	^{206}Pb	13.8-18.5, 44-60, 59-85	CE	[1978Jo04]	
^{206}Pb	0.095(5)				α, ^{16}O	^{206}Pb	15-18, 69-80	CE	[1972Ha59]	
^{206}Pb	0.103(8)				α, ^{16}O	^{206}Pb	15, 18; 70, 80	CE	[1971Gr31]	
^{206}Pb			13.2(8)		^{40}Ar	^{206}Pb	170	RDM	[1970Qu02]	
^{206}Pb	0.108(10)				^{12}C	^{206}Pb	45.5-60.2	CE	[1966Hr01]	
^{206}Pb	0.13(5)				α	^{206}Pb	20	CE	[1962Na06]	
^{206}Pb	0.115				p	^{206}Pb	4.67	CE*	[1960BaZZ]	NR
^{206}Pb	0.125(35)				p	Pb	4-5	CE	[1955St57]	
^{208}Pb	0.25(6)				γ	^{208}Pb	7.0-7.4	GG	[2008Sh23]	
^{208}Pb			0.00147(10)		γ	^{208}Pb	4-7	GG	[2003En07]	

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Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{208}Pb			0.00095(12)		γ	^{208}Pb	9	GG	[2001RyZZ]	
^{208}Pb			0.0015(1)		γ	^{208}Pb	4-7	GG	[2000En08]	Su, NR
^{208}Pb	0.275(7)				^{12}C, ^{16}O	^{208}Pb	53-76	CE	[1984Ve07]	NR
^{208}Pb	0.318(32)				e	^{208}Pb	52-502	EE	[1984Pa02]	
^{208}Pb	0.318(16)				e	^{208}Pb	50-335	EE	[1982He03]	
^{208}Pb			0.00097(21)		γ	^{208}Pb	7.0, 7.6, 8.0, 8.5	GG	[1980Ch22]	
^{208}Pb			0.0013(5)		γ	^{208}Pb	6.6, 9.7	GG	[1977Co10]	
^{208}Pb			0.00134(14)		γ	^{208}Pb	4-5	GG	[1974Sw05]	
^{208}Pb	0.30(2)				e	^{208}Pb	28-73	EE	[1968Zi02]	
^{208}Pb	$0.83(^{+0.18}_{-0.25})$				^{12}C	^{208}Pb	45.5-60.2	CE	[1966Hr01]	Ex
^{210}Pb	0.051(15)				t	^{210}Pb	20	IN-EL	[1971El03]	
^{194}Po			37(7)		^{83}Kr	^{114}Cd	340-375	RDM	[2008Gr04]	
^{194}Po			37(7)		^{83}Kr	^{114}Cd	340-375	RDM	[2006Gr16]	Su
^{196}Po	$1.85(^{+14}_{-16})$				^{196}Po	^{104}Pd	2.85A	CE	[2015KeZZ]	Gos
^{196}Po			11.6(15)		^{86}Kr	^{113}Cd	382	RDM	[2009Gr08]	
^{198}Po	$1.30(^{+29}_{-24})$				^{198}Po	^{94}Mo	2.85A	CE	[2015KeZZ]	Gos
^{200}Po	1.06(6)				^{200}Po	^{104}Pd	2.85A	CE	[2015KeZZ]	Gos
^{202}Po	$1.12(^{+34}_{-26})$				^{202}Po	^{104}Pd, ^{94}Mo	2.85A	CE	[2015KeZZ]	Gos
^{210}Po	0.0200(40)				d, p, t	^{210}Po	17.0, 17.8, 20.0	CE*	[1973El06]	
^{214}Po			<6					DC	[2011ReZZ]	
^{202}Rn	$1.00(^{+32}_{-26})$				^{202}Rn	^{109}Ag, ^{120}Sn	2.9A	CE	[2015Ga19]	Gos
^{204}Rn	$1.51(^{+59}_{-45})$				^{204}Rn	^{109}Ag, ^{120}Sn	2.9A	CE	[2015Ga19]	Gos
^{214}Rn			<2000		^{9}Be	^{208}Pb	45-57	DC	[1987Dr08]	NR
^{218}Rn			<115					DC	[1960Be25]	
^{220}Rn	1.88(11)				^{220}Rn	^{60}Ni, ^{120}Sn	2.82A	CE	[2013Ga23]	
^{220}Rn			209(7)					DC	[1965Ne03]	
^{220}Rn			211(7)					DC	[1960Be25]	
^{222}Rn			400(150)					DC	[1961Fo08]	
^{222}Rn			462(29)					DC	[1960Be25]	
^{218}Ra			43(4)		^{13}C	^{208}Pb	5.3A	RDM	[1988Ga33]	NR
^{218}Ra			40(7)		^{13}C	^{208}Pb	5.3A	RDM	[1984EnZY]	Su
^{218}Ra					^{13}C	^{208}Pb	59-67	RDM	[1983Ga11]	Su, NR
^{222}Ra			750(60)					DC	[1960Be25]	
^{224}Ra	3.96(12)				^{224}Ra	^{60}Ni, ^{120}Sn	2.83A	CE	[2013Ga23]	
^{224}Ra			1079(29)			^{228}Th(α)		DC	[1970To08]	
^{224}Ra			1073(14)			^{228}Th(α)		DC	[1965Ne03]	
^{224}Ra			1150(100)					DC	[1961Fo08]	
^{224}Ra			1096(43)					DC	[1960Be25]	
^{224}Ra			1000(150)					DC	[1959Si74]	
^{224}Ra			1080(220)					DC	[1959Si74]	
^{226}Ra	5.15(14)				α, ^{16}O, ^{32}S, ^{208}Pb	^{226}Ra	15-17, 63, 135, 978	CE*	[1993Wo05]	
^{226}Ra			900(100)					DC	[1961Fo08]	
^{226}Ra			710(130)			^{230}Th(α)		DC	[1960Un02]	
^{226}Ra			909(29)					DC	[1960Be25]	
^{226}Ra			910(100)			^{230}Th(α)		DC	[1958Va04]	
^{228}Ra			793(29)			^{228}Fr(β^-)		DC	[1998Gu09]	
^{228}Ra			790(60)					DC	[1960Be25]	
^{222}Th			346(29)		^{16}O	^{208}Pb	94	RDM	[1985Bo32]	
^{224}Th			851(58)		α	^{226}Ra	55	DC	[1986Sc18]	NR
^{226}Th			570(29)					DC	[1960Be25]	
^{228}Th			590(14)			^{232}U(α)		DC	[1970To08]	
^{228}Th			580(14)			^{232}U(α)		DC	[1965Ne03]	
^{228}Th			577(43)					DC	[1960Be25]	
^{230}Th	8.06(11)				α	^{230}Th	16,17	CE	[1973Be44]	
^{230}Th	8.01(11)				α	^{230}Th	17,18	CE	[1971Fo17]	Su
^{230}Th			511(13)			^{234}U(α)		DC	[1965Ne03]	
^{230}Th	11.1(17)				α	^{230}Th	2.2	CE	[1961Re02]	
^{230}Th			534(29)					DC	[1960Be25]	
^{232}Th	9.21(18)				α	^{232}Th	16.5,17.0	CE	[1974Ba43]	
^{232}Th	9.5(12)?				d	^{232}Th	12	CE*	[1974ThZG]	Ex, NR
^{232}Th			462(35)		α	^{232}Th	6	Mossbauer	[1973Ca29]	
^{232}Th	9.21(9)				α	^{232}Th	16,17	CE	[1973Be44]	
^{232}Th	9.1(6)				d	^{232}Th	16	CE*	[1972El08]	
^{232}Th	9.40(20)				α	^{232}Th	17,18	CE	[1971Fo17]	Su
^{232}Th	11.5(17)				α	^{232}Th	2.2	CE	[1961Re02]	
^{232}Th	9.8(6)				p,d	^{232}Th	3.5-4.5	CE	[1961Sk01]	
^{232}Th	6.3(12)				p	^{232}Th	4-6	CE	[1960Mc13]	
^{232}Th			498(22)					DC	[1960Be25]	
^{234}Th			534(43)					DC	[1960Be25]	
^{230}U			375(43)					DC	[1960Be25]	
^{232}U			366(29)					DC	[1960Be25]	
^{234}U	10.90(10)				α	^{234}U	16-19	CE	[1973Be44]	
^{234}U	10.33(26)				α	^{234}U	17,18	CE	[1971Fo17]	Su
^{234}U			364(10)			^{238}Pu(α)		DC	[1970To08]	
^{234}U	9.7(8)				d	^{234}U		CE	[1965Fr11]	
^{234}U	11.4(17)				α	^{234}U	2.2	CE	[1961Re02]	
^{234}U			384(29)					DC	[1960Be25]	

(*continued on next page*)

Table 1 (*continued*)

Nuclide	B(E2) (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	Beam	Target	Energy (MeV)	Method	Reference	Comment
^{236}U	11.60(15)				α	^{236}U	16,17	CE	[1973Be44]	
^{236}U	11.62(23)				α	^{236}U	17,18	CE	[1971Fo17]	Su
^{236}U			339(9)			^{240}Pu(α)		DC	[1970To08]	
^{236}U	11.2(21)				d	^{236}U		CE	[1965Fr11]	
^{236}U	13.1(20)				α	^{236}U	2.2	CE	[1961Re02]	
^{236}U			335(29)					DC	[1960Be25]	
^{238}U	12.7(17)				d, α	^{238}U	12,13, 16,19,20	CE*	[1974ThZG]	
^{238}U	12.30(15)				α	^{238}U	16-18	CE	[1973Be44]	
^{238}U	11.7(8)				d	^{238}U	16	CE*	[1972El08]	
^{238}U	11.70(15)				α	^{238}U	17,18	CE	[1971Fo17]	Su
^{238}U	13.2(20)				α	^{238}U	2.2	CE	[1961Re02]	
^{238}U	12.7(7)				p,d	^{238}U	3.5-4.5	CE	[1961Sk01]	
^{238}U			325(29)					DC	[1960Be25]	
^{238}Pu	12.63(17)				α	^{238}Pu	17	CE	[1973Be44]	
^{238}Pu	12.58(35)				α	^{238}Pu	17,18	CE	[1971Fo17]	Su
^{238}Pu			255(7)			^{242}Cm(α)		DC	[1970To08]	
^{238}Pu			264(22)					DC	[1960Be25]	
^{240}Pu	13.33(18)				α	^{240}Pu	17	CE	[1973Be44]	
^{240}Pu	12.57(35)				α	^{240}Pu	17,18	CE	[1971Fo17]	Su
^{240}Pu			237(7)			^{244}Cm(α)		DC	[1970To08]	
^{240}Pu	12.90(30)				d	^{240}Pu		CE	[1965Fr11]	
^{240}Pu			231(29)			^{244}Cm(α)		TDSA	[1964No01]	
^{240}Pu			250(22)					DC	[1960Be25]	
^{242}Pu	13.47(18)				α	^{242}Pu	17	CE	[1973Be44]	
^{242}Pu	16.5(14)				d	^{242}Pu	16	CE*	[1972El08]	
^{242}Pu	13.26(35)				α	^{242}Pu	17,18	CE	[1971Fo17]	Su
^{242}Pu	13.9(12)				d	^{242}Pu		CE	[1965Fr11]	
^{244}Pu	13.61(18)				α	^{244}Pu	17	CE	[1973Be44]	
^{244}Pu	13.83(37)				α	^{244}Pu	17,18	CE	[1971Fo17]	Su
^{240}Cm			190(13)		α	^{239}Pu	27,33	RDM	[1978Ul01]	
^{244}Cm	14.58(19)				α	^{244}Cm	17	CE	[1973Be44]	
^{244}Cm	14.86(35)				α	^{244}Cm	17,18	CE	[1971Fo17]	Su
^{244}Cm			140(7)			^{244}Am(β^-)		DC	[1962Ch19]	Ex
^{246}Cm	14.94(19)				α	^{246}Cm	17	CE	[1973Be44]	
^{246}Cm	15.03(45)				α	^{246}Cm	17,18	CE	[1971Fo17]	Su
^{248}Cm	13.7(8)				^{136}Xe, ^{58}Ni	^{248}Cm	641, 260	CE	[1986Cz02]	
^{248}Cm	14.99(19)				α	^{248}Cm	17	CE	[1973Be44]	
^{248}Cm	15.03(55)				α	^{248}Cm	17,18	CE	[1971Fo17]	Su
^{248}Cm			182(14)			^{252}Cf(α)		DC	[1970To08]	
^{250}Cf	16.0(16)				d	^{250}Cf	15	CE*	[1980Ah01]	
^{252}Cf	16.7(11)				α	^{252}Cf	17,18	CE	[1971Fo17]	

Table 2
Comparative analysis of the present and S. Raman et al. [13] results. Both the present work and inverse B(E2)↑ have been calculated for the nuclides where multiple experimental results are available and no new measurements have been reported since the previous evaluation.

Nuclide	Inverse squared B(E2)↑ (e^2b^2)	Inverse B(E2)↑ (e^2b^2)	Raman's B(E2)↑ [13] (e^2b^2)	Comments on Raman's values
^{12}C	0.00397(20)	0.00395(20)	0.00397(33)	
^{16}O	0.00371(39)	0.00354(22)	0.00406(38)	Different exclusions
^{18}O	0.00430(38)	0.00429(19)	0.00451(20)	
^{20}O	0.00298(26)	0.00265(22)	0.00281(20)	
^{20}Ne	0.0333(16)	0.0369(27)	0.0340(30)	
^{24}Ne	$0.0143(^{+57}_{-24})$	$0.01351(^{+50}_{-30})$	0.017(6)	τ was symmetrized
^{22}Mg	$0.034(^{+16}_{-11})$	0.038(44)	0.037(13)	
^{28}Si	$0.03267(^{+55}_{-45})$	0.0325(16)	0.0326(12)	
^{30}Si	0.02081(64)	0.0218(10)	0.0215(10)	
^{32}Si	$0.0122(^{+36}_{-21})$	0.0131(22)	0.0113(33)	Latest result was adopted
^{34}S	0.02083(120)	0.0215(10)	0.0212(12)	
^{34}Ar	0.0232(29)	0.0253(40)	0.0240(40)	
^{42}Ti	0.086(16)	0.0877(81)	0.087(25)	
^{48}Cr	0.137(15)	0.133(16)	0.136(21)	
^{54}Cr	0.0853(42)	0.0848(30)	0.0870(40)	Extended dataset, EE included
^{54}Fe	0.0608 (31)	0.0596(20)	0.062(5)	
^{56}Fe	0.0981(20)	0.0978(20)	0.0980(40)	
^{58}Fe	0.122(6)	0.1160(57)	0.1200(40)	
^{60}Fe	0.0938(88)	0.094(10)	0.096(18)	
^{72}Ge	0.2087(30)	0.2084(30)	0.213(6)	
^{76}Se	$0.432(^{+15}_{-6})$	0.4374(90)	0.420(10)	Missing data
^{80}Sr	0.909(40)	0.890(48)	0.959(36)	Different exclusions
^{82}Sr	$0.505(^{+29}_{-20})$	0.497(26)	0.513(20)	
^{98}Sr	1.240(61)	1.213(64)	1.282(39)	
^{100}Sr	1.22(17)	1.22(16)	1.42(8)	Latest was adopted
^{82}Zr	$0.91(^{+12}_{-5})$	0.98(11)	0.91(9)	Earliest experiment was adopted
^{94}Zr	0.0629(45)	0.0660(35)	0.066(14)	Missing data
^{100}Zr	$1.110(^{+51}_{-36})$	1.043(43)	1.11(6)	
^{92}Mo	0.0975(43)	0.1009(56)	0.097(6)	
^{96}Mo	0.2775(59)	0.284(14)	0.271(5)	
^{100}Mo	0.530(22)	0.546(24)	0.516(10)	Missing data
^{102}Mo	$0.976(^{+49}_{-40})$	0.995(48)	0.963(31)	
^{104}Mo	1.28(11)	1.165(59)	1.34(8)	Missing data
^{100}Ru	0.4927(41)	0.4895(30)	0.490(5)	
^{102}Ru	0.632(12)	0.6430(290)	0.630(10)	
^{108}Ru	$0.894(^{+80}_{-58})$	0.954(80)	1.01(15)	Missing data
^{110}Ru	1.071(61)	0.989(74)	1.05(12)	
^{112}Ru	1.107(96)	1.04(13)	1.17(23)	
^{102}Pd	0.460(23)	0.460(30)	0.460(30)	
^{104}Pd	0.529(15)	0.528(30)	0.535(35)	
^{106}Pd	0.660(17)	0.651(37)	0.660(35)	
^{108}Pd	0.764(20)	0.763(41)	0.760(40)	
^{106}Cd	0.407(12)	0.412(19)	0.410(20)	
^{112}Cd	0.5012(220)	0.498(22)	0.510(20)	
^{114}Cd	0.5362(250)	0.537(25)	0.545(20)	
^{116}Cd	0.580(26)	0.588(26)	0.560(20)	Missing data
^{124}Te	0.560(28)	0.588(28)	0.568(6)	
^{120}Xe	1.739(110)	1.69(11)	1.73(11)	
^{122}Xe	1.349(68)	1.360(71)	1.40(6)	
^{124}Ba	2.096(78)	1.958(70)	2.09(10)	
^{126}Ba	1.740(80)	1.761(85)	1.75(9)	
^{132}Ba	0.847(57)	0.828(60)	0.86(6)	
^{134}Ba	0.665(19)	0.658(33)	0.658(7)	
^{138}Ba	0.2302(110)	0.235(11)	0.230(9)	
^{146}Ba	1.350(68)	1.336(68)	1.355(48)	
^{126}Ce	3.65(46)	$3.68(^{+46}_{-37})$	2.68(48)	Missing data
^{128}Ce	2.27(13)	2.27(18)	2.28(22)	
^{130}Ce	1.755(79)	1.804(79)	1.74(10)	
^{132}Ce	1.69(11)	1.676(74)	1.87(17)	Missing data
^{134}Ce	1.062(85)	1.054(91)	1.04(9)	
^{140}Ce	0.2997(150)	0.298(15)	0.298(6)	Missing data
^{142}Ce	0.4572(50)	0.4547(50)	0.480(6)	
^{144}Ce	$0.96(^{+30}_{-18})$	0.97(20)	0.83(9)	Different exclusions
^{146}Ce	0.952 (90)	1.060(73)	1.14(12)	Missing data
^{150}Ce	3.18(48)	3.16(60)	3.3(8)	Missing data
^{132}Nd	3.58(59)	3.54(59)	3.5(6)	
^{134}Nd	$1.879(^{+58}_{-46})$	1.915(35)	1.83(37)	Missing data
^{142}Nd	0.2650(130)	0.279(13)	0.265(6)	
^{144}Nd	0.504(15)	0.483(25)	0.491(5)	

(*continued on next page*)

Table 2 (*continued*)

Nuclide	Inverse squared B(E2)↑ (e^2b^2)	Inverse B(E2)↑ (e^2b^2)	Raman's B(E2)↑ [13] (e^2b^2)	Comments on Raman's values
^{146}Nd	0.748(22)	0.736(38)	0.760(25)	
^{148}Nd	1.338(30)	1.298(68)	1.35(5)	
^{150}Nd	2.707(30)	2.721(42)	2.760(40)	Different exclusions
^{152}Nd	4.10(22)	4.11(22)	4.20(28)	Missing data
^{138}Sm	1.30(19)	1.37(22)	1.41(23)	Unweighted average
^{144}Sm	0.259(19)	0.268(13)	0.262(6)	Missing data
^{148}Sm	0.713(35)	0.718(35)	0.720(30)	
^{150}Sm	1.347(26)	1.339(68)	1.350(30)	
^{154}Sm	4.345(44)	4.370(69)	4.36(5)	Missing data
^{152}Gd	1.655(65)	1.626(82)	1.67(14)	
^{154}Gd	3.872(16)	3.859(16)	3.89(7)	
^{156}Gd	4.697(110)	4.70(11)	4.64(5)	Missing data
^{158}Gd	5.093(110)	5.10(11)	5.02(5)	
^{154}Dy	2.421(120)	2.40(12)	2.39(13)	
^{158}Dy	4.66(11)	4.66(23)	4.66(5)	
^{160}Dy	5.049(40)	5.057(38)	5.13(11)	
^{162}Dy	5.227(84)	5.172(84)	5.35(11)	Missing data
^{164}Dy	5.616(68)	5.607(88)	5.60(5)	
^{156}Er	1.645(80)	1.647(81)	1.64(7)	Missing data
^{160}Er	4.34(15)	4.36(22)	4.38(20)	
^{164}Er	5.50(12)	5.433(92)	5.45(6)	
^{166}Er	5.748(89)	5.732(89)	5.83(5)	Missing data
^{168}Er	5.723(45)	5.804(59)	5.79(10)	Different exclusions
^{160}Yb	2.44(16)	2.46(16)	2.66(16)	Latest result was adopted
^{164}Yb	4.33(14)	4.32(21)	4.38(26)	
^{166}Yb	5.20(20)	5.20(26)	5.24(31)	
^{170}Yb	5.721(70)	5.753(70)	5.79(13)	
^{172}Yb	6.088(150)	6.10(15)	6.04(7)	
^{174}Yb	5.853(160)	5.85(16)	5.94(6)	Missing data
^{176}Yb	5.189(89)	5.247(93)	5.30(19)	
^{164}Hf	1.82(17)	1.79(25)	2.14(18)	Earlier result was adopted
^{176}Hf	5.416(170)	5.42(17)	5.27(10)	Missing data
^{178}Hf	4.736(63)	4.684(94)	4.82(6)	Missing data
^{180}Hf	4.6470(30)	4.6486(30)	4.67(12)	Missing data
^{170}W	3.50(17)	3.52(17)	3.51(10)	
^{180}W	4.419(77)	4.224(86)	4.25(24)	
^{182}W	4.123(42)	4.108(42)	4.20(8)	Missing data
^{184}W	3.706(35)	3.692(35)	3.78(13)	Missing data
^{186}W	3.500(38)	3.468(33)	3.50(12)	
^{182}Os	3.896(85)	3.83(13)	3.86(35)	Missing data
^{184}Os	3.214(79)	3.196(34)	3.23(16)	
^{186}Os	3.064(72)	3.068(72)	2.90(10)	Different exclusions
^{192}Os	2.031(100)	2.07(10)	2.100(30)	Missing data
^{184}Pt	3.79(20)	3.76(21)	3.78(27)	
^{190}Pt	1.854(90)	1.943(90)	1.75(22)	Missing data
^{192}Pt	1.908(68)	1.980(65)	1.870(40)	Missing data
^{194}Pt	1.631(68)	1.634(68)	1.642(22)	
^{198}Pt	1.072(50)	1.088(50)	1.080(12)	Different exclusions
^{196}Hg	1.143(82)	1.19(11)	1.15(5)	Latest was adopted
^{198}Hg	0.9612(70)	0.9674(60)	0.990(12)	Missing data
^{200}Hg	0.855(28)	0.858(43)	0.853(11)	
^{202}Hg	0.615(21)	0.624(30)	0.612(10)	
^{204}Hg	0.424(21)	0.416(21)	0.427(7)	Missing data
^{204}Pb	0.1587(69)	0.1569(90)	0.1620(40)	
^{206}Pb	0.0989(28)	0.1009(50)	0.1000(20)	Rounded number
^{226}Ra	5.16(13)	5.23(16)	5.15(14)	
^{228}Th	7.05(12)	7.05(17)	7.06(24)	
^{230}Th	8.14(21)	8.24(21)	8.04(10)	Double-counted the same experiment
^{232}Th	9.02(38)	9.05(38)	9.28(10)	Double-counted the same experiment
^{234}U	10.22(50)	10.23(50)	10.66(20)	Double-counted the same experiment
^{236}U	10.96(28)	11.17(28)	11.61(15)	Double-counted the same experiment
^{238}U	12.19(62)	12.21(62)	12.09(20)	Double-counted the same experiment
^{238}Pu	12.26(34)	12.25(34)	12.61(17)	Double-counted the same experiment
^{240}Pu	13.13(39)	13.10(39)	13.02(30)	Double-counted the same experiment
^{242}Pu	14.01(75)	14.30(67)	13.40(16)	Double-counted the same experiment
^{248}Cm	14.43(75)	14.43(75)	14.99(19)	Double-counted the same experiment

Table 3
Adopted (recommended) B(E2)↑-, τ- and β_2-values for $Z = 2$–104 nuclei. Model-independent, combined (*) and model-dependent (**) values are compared with S. Raman et al. [13] evaluation.

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{4}He	27420(90)					
^{6}He	1797(25)	0.00054(7)**?	1.67(22)**?	40.3($^{+60}_{-46}$)**?	1.024(66)**?	
^{8}He	3100(500)					
^{10}He	3240(200)					
^{6}Be	1670(50)					
^{8}Be	3030(10)					
^{10}Be	3368.03 (3)	0.00467($^{+23}_{-18}$)	7.30($^{+36}_{-28}$)	0.2017($^{+79}_{-95}$)	1.071($^{+26}_{-20}$)	0.0053(6)
^{12}Be	2102(12)	0.0040($^{+22}_{-11}$)	4.9($^{+27}_{-13}$)	2.49($^{+94}_{-88}$)	0.88($^{+24}_{-12}$)	
^{14}Be	1540(130)					
^{10}C	3353.7 (6)	0.00450(42)	7.03(66)	0.214($^{+22}_{-19}$)	0.701($^{+32}_{-34}$)	0.0064(10)
^{12}C	4438.91 (31)	0.00397(20)	4.86(25)	0.0596($^{+31}_{-29}$)	0.583(15)	0.00397(33)
		0.00397(20)*	4.86(25)*	0.0596($^{+31}_{-29}$)*		
^{14}C	7012 (4)					0.00187(25)
		0.00187(25)*	1.87(25)*	0.0129($^{+20}_{-15}$)*	0.361(24)*	
^{16}C	1766 (10)	0.00179(20)	1.50(17)	13.2($^{+16}_{-13}$)	0.323(18)	
^{18}C	1620 (20)	0.00168($^{+23}_{-15}$)	1.20($^{+16}_{-11}$)	21.8($^{+22}_{-26}$)	0.289($^{+20}_{-13}$)	
^{20}C	1618 (6)	0.0038($^{+17}_{-8}$)	2.3($^{+10}_{-5}$)	9.8($^{+28}_{-30}$)	0.405($^{+89}_{-45}$)	
^{12}O	1800(400) ?					
^{14}O	6590(10)					
^{16}O	6917.1 (6)	0.00371(39)	3.098(326)	0.00694(82)	0.349(19)	0.00406(38)
		0.00390(22)*	3.257(184)*	0.00660(35)*	0.358(10)*	
^{18}O	1982.07 (9)	0.00430(38)	3.07(27)	3.10($^{+30}_{-25}$)	0.347(16)	0.00451(20)
		0.00431(39)*	3.08(28)*	3.09($^{+31}_{-26}$)*	0.348(15)*	
^{20}O	1673.60 (15)	0.00298(26)	1.85(16)	10.4($^{+10}_{-8}$)	0.269($^{+10}_{-8}$)	0.00281(20)
^{22}O	3199 (8)	0.0021(8)	1.15(44)	0.58($^{+36}_{-16}$)	0.212(40)	0.0021(8)
^{24}O	4720(110)					
		0.00118(63)**	0.57(31)**	0.14($^{+16}_{-5}$)**	0.150(40)**	
^{26}O	∼1800					
^{16}Ne	1690(70)					
^{18}Ne	1887.3 (2)	0.0243(16)	17.4(11)	0.700($^{+46}_{-43}$)	0.661(21)	0.0269(26)
^{20}Ne	1633.674 (15)	0.0333(16)	20.7(10)	1.053($^{+54}_{-49}$)	0.721(18)	0.0340(30)
		0.0327(15)*	20.29(96)*	1.072($^{+53}_{-48}$)*	0.714(17)*	
^{22}Ne	1274.577 (7)	0.02298(42)	12.55(23)	5.281(98)	0.5616(51)	0.0230(10)
		0.02305(38)*	12.59(21)*	5.266(89)*	0.5625(47)*	
^{24}Ne	1981.6 (4)	0.0143($^{+57}_{-24}$)	6.9($^{+28}_{-12}$)	0.94($^{+19}_{-27}$)	0.418($^{+84}_{-35}$)	0.017(6)
^{26}Ne	2018.2 (1)	0.0155(32)	6.8(14)	0.79($^{+20}_{-13}$)	0.413(43)	0.0228(41)
^{28}Ne	1304 (3)	0.0136(23)	5.37(90)	8.0($^{+16}_{-11}$)	0.367(31)	0.027(14)
		0.0153(16)**	6.06(63)**	7.07($^{+83}_{-67}$)**	0.39(2)**	
^{30}Ne	791 (26)					
		0.0226(35)**	8.2(13)**	58($^{+12}_{-8}$)**	0.453(37)**	
^{32}Ne	722(9)					
^{20}Mg	1598 (10)					
		0.0179(33)**	11.1(20)**	1.96($^{+44}_{-30}$)**	0.44(4)**	
^{22}Mg	1247.02 (3)	0.034($^{+16}_{-11}$)	18.4($^{+89}_{-61}$)	4.0($^{+20}_{-13}$)	0.57($^{+14}_{-9}$)	0.037(13)
^{24}Mg	1368.672 (5)	0.04372(90)	21.27(44)	1.944(41)	0.6092(62)	0.0432(11)
		0.04339(80)*	21.10(39)*	1.959(37)*	0.6069(56)*	
^{26}Mg	1808.73 (3)	0.03136(72)	13.71(31)	0.672(16)	0.4891(56)	0.0305(13)
		0.03113(67)*	13.61(29)*	0.677(15)*	0.4873(52)*	
^{28}Mg	1473.88 (18)	0.0366(46)	14.5(18)	1.60($^{+23}_{-18}$)	0.503(31)	0.035(5)
^{30}Mg	1482.8 (3)	0.0273(26)	9.86(94)	2.09($^{+22}_{-19}$)	0.415(20)	0.0295(26)
		0.0435(58)**	15.7(21)**	1.31($^{+20}_{-16}$)**	0.524(36)**	
^{32}Mg	885.3 (1)	0.0434(52)	14.4(17)	17.3($^{+24}_{-20}$)	0.501(30)	0.039(7)
		0.0406(62)**	13.5(22)**	18.5($^{+33}_{-26}$)**	0.0484(38)**	
^{34}Mg	652(6)	0.0573(79)	17.5(24)	56.9($^{+91}_{-69}$)	0.553(37)	
		0.073(15)**	22.3(46)**	45($^{+12}_{-8}$)**	0.624($^{+61}_{-68}$)**	
^{36}Mg	662(6)					
		0.051($^{+13}_{-11}$)**	14.3($^{+37}_{-32}$)**	63($^{+19}_{-13}$)**	0.50(6)**	

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{38}Mg	656(6)					
^{24}Si	1879 (11)	0.0096(30)	4.7(15)	$1.40(^{+64}_{-33})$	0.245(38)	
^{26}Si	1795.9 (2)	0.0344(25)	15.1(11)	0.635(47)	0.439(16)	0.0356(34)
^{28}Si	1779.030 (11)	$0.03267(^{+55}_{-45})$	$12.94(^{+22}_{-18})$	$0.701(^{+10}_{-12})$	$0.4073(^{+34}_{-28})$	0.0326(12)
		$0.03281(^{+53}_{-44})$*	$12.99(^{+21}_{-17})$*	$0.698(^{+10}_{-11})$*	$0.4082(^{+33}_{-27})$*	
^{30}Si	2235.322 (18)	0.02081(64)	7.52(23)	0.351(11)	0.3105(48)	0.0215(10)
		0.02084(61)*	7.53(22)*	$0.351(^{+11}_{-10})$*	0.3107(45)*	
^{32}Si	1941.4 (3)	$0.0122(^{+36}_{-21})$	$4.1(^{+12}_{-7})$	$1.21(^{+25}_{-28})$	$0.228(^{+34}_{-20})$	0.0113(33)
^{34}Si	3327.7 (5)	0.0085(33)	2.6(10)	$0.118(^{+75}_{-33})$	0.183(35)	0.0085(33)
^{36}Si	1399 (25)	0.0193(59)	5.5(17)	$4.0(^{+17}_{-9})$	0.265(40)	0.019(6)
^{38}Si	1084 (20)	0.0193(71)	5.1(19)	$14.1(^{+82}_{-38})$	0.255(47)	0.019(7)
^{40}Si	986 (5)?	0.043(12)	10.6(30)	$10.2(^{+39}_{-22})$	0.37(5)	
^{42}Si	742(8)					
^{28}S	1512(8)	0.0181(31)	7.2(12)	$2.90(^{+60}_{-42})$	0.265(23)	
^{30}S	2210.6 (5)	0.0324(22)	11.70(79)	$0.239(^{+17}_{-15})$	0.339(11)	0.0324(41)
^{32}S	2230.57 (15)	$0.02958(^{+85}_{-44})$	$9.80(^{+28}_{-15})$	$0.2500(^{+38}_{-70})$	$0.3102(^{+44}_{-23})$	0.0300(13)
		0.02914(95)*	9.66(31)*	$0.2538(^{+86}_{-80})$*	0.3079(50)*	
^{34}S	2127.564 (13)	0.02083(120)	6.37(37)	$0.449(^{+27}_{-25})$	0.250(7)	0.0212(12)
		0.02047(100)*	6.26(31)*	$0.457(^{+23}_{-21})$*	$0.248(^{+5}_{-6})$*	
^{36}S	3290.9 (3)	$0.00886(^{+87}_{-52})$	$2.51(^{+25}_{-15})$	$0.119(^{+8}_{-11})$	$0.1569(^{+77}_{-46})$	0.0104(28)
^{38}S	1292.0 (2)	0.0235(30)	6.19(79)	$4.82(^{+71}_{-55})$	0.247(16)	0.0235(30)
^{40}S	903.69 (7)	0.0334(36)	8.22(89)	$20.3(^{+24}_{-20})$	0.284(15)	0.0334(36)
^{42}S	890 (15)	0.0397(63)	9.2(15)	$18.4(^{+35}_{-25})$	0.300(24)	0.040(6)
^{44}S	1329.0 (5)	0.0314(88)	6.8(19)	$3.1(^{+12}_{-7})$	0.258(36)	0.031(9)
^{46}S	952(8)					
^{32}Ar	1867 (8)	0.0266(68)	8.8(23)	$0.68(^{+23}_{-14})$	0.261(33)	
^{34}Ar	2090.9 (3)	0.0232(29)	7.10(88)	$0.440(^{+62}_{-48})$	0.235(14)	0.0240(40)
^{36}Ar	1970.39 (5)	$0.0301(^{+20}_{-11})$	$8.53(^{+58}_{-32})$	$0.456(^{+18}_{-29})$	$0.2573(^{+87}_{-48})$	0.0300(30)
		$0.0290(^{+14}_{-8})$*	$8.22(^{+40}_{-22})$*	$0.473(^{+13}_{-22})$*	$0.2526(^{+62}_{-34})$*	
^{38}Ar	2167.64 (5)	0.01245(42)	3.28(11)	$0.685(^{+24}_{-23})$	0.1595(27)	0.0130(10)
^{40}Ar	1460.851 (6)	0.0332(17)	8.18(43)	$1.85(^{+10}_{-9})$	0.2519(66)	0.0330(40)
		0.0355(15)*	8.73(37)*	$1.730(^{+76}_{-69})$*	0.2602(54)*	
^{42}Ar	1208.24 (13)	$0.042(^{+11}_{-9})$	$9.6(^{+26}_{-20})$	$3.8(^{+10}_{-8})$	$0.273(^{+36}_{-28})$	0.043(10)
^{44}Ar	1157.97 (11)	$0.0358(^{+36}_{-22})$	$7.77(^{+78}_{-47})$	$5.47(^{+36}_{-50})$	$0.246(^{+12}_{-8})$	0.0345(41)
^{46}Ar	1577 (1)	0.0243(22)	4.96(45)	$1.82(^{+18}_{-15})$	0.196(9)	0.0196(39)
^{48}Ar	1038(6)	0.0346(55)	6.7(11)	$3.08(^{+58}_{-42})$	0.228(18)	
^{50}Ar	1178(18)					
^{36}Ca	3045.0(24)					
^{38}Ca	2213.13 (10)	0.0097(27)	2.56(71)	$0.79(^{+31}_{-17})$	$0.127(^{+16}_{-19})$	0.0096(21)
^{40}Ca	3904.38 (3)	0.00924(68)	2.28(17)	$0.0486(^{+39}_{-33})$	0.1196(44)	0.0099(17)
		0.00739(50)*	1.82(12)*	$0.0608(^{+44}_{-38})$*	0.1069(36)*	
^{42}Ca	1524.70 (3)	0.0369(20)	8.51(45)	$1.343(^{+76}_{-68})$	0.2312(62)	0.0420(30)
		0.0368(17)*	8.48(40)*	$1.347(^{+66}_{-60})$*	0.2309(54)*	
^{44}Ca	1157.019 (4)	0.0467(21)	10.13(46)	$4.21(^{+20}_{-18})$	0.2522(57)	0.0470(20)
		0.0485(18)*	10.52(40)*	$4.06(^{+16}_{-15})$*	0.2570(49)*	
^{46}Ca	1346.0 (3)	0.0168(13)	3.43(26)	$5.50(^{+46}_{-40})$	0.1468(58)	0.0182(13)
^{48}Ca	3831.72 (6)	$0.0092(^{+12}_{-5})$	$1.77(^{+23}_{-10})$	$0.0539(^{+31}_{-63})$	$0.1054(^{+70}_{-29})$	0.0095(32)
		$0.00844(^{+54}_{-23})$*	$1.63(^{+10}_{-4})$*	$0.0585(^{+16}_{-35})$*	$0.1012(^{+32}_{-14})$*	
^{50}Ca	1026.72 (10)	$0.00373(^{+20}_{-18})$	$0.682(^{+37}_{-33})$	96(5)	$0.0654(^{+18}_{-16})$	
^{52}Ca	2563.1(10)					
^{54}Ca	2043(19)					
^{42}Ti	1556.0 (8)	0.086(16)	19.8(37)	0.520(97)	0.321(30)	0.087(25)
^{44}Ti	1083.06 (9)	$0.0680(^{+59}_{-28})$	$14.7(^{+13}_{-6})$	$4.03(^{+18}_{-32})$	$0.277(^{+12}_{-6})$	0.065(16)
^{46}Ti	889.286 (3)	0.0951(25)	19.42(52)	$7.72(^{+21}_{-20})$	0.3175(42)	0.095(5)
		0.0900(33)*	18.40(68)*	$8.15(^{+31}_{-29})$*	0.3091(57)*	
^{48}Ti	983.5390 (24)	0.0662(29)	12.77(56)	$6.70(^{+31}_{-28})$	0.2575(56)	0.0720(40)
		0.0627(27)*	12.11(53)*	$7.07(^{+32}_{-30})$*	0.2507(55)*	
^{50}Ti	1553.778 (7)	0.0275(16)	5.04(30)	$1.64(^{+10}_{-9})$	0.1617(48)	0.0290(40)
		0.0284(14)*	5.18(26)*	$1.589(^{+82}_{-75})$*	0.1641(40)*	

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{52}Ti	1049.73 (10)	$0.0603(^{+29}_{-24})$	$10.46(^{+50}_{-41})$	$5.31(^{+22}_{-24})$	$0.2331(^{+56}_{-46})$	
^{54}Ti	1494.8 (8)	0.0357(63)	5.9(10)	$1.53(^{+33}_{-23})$	0.175(15)	
^{56}Ti	1128.2 (4)	0.060(20)	9.4(31)	$3.7(^{+19}_{-9})$	0.221(37)	
^{58}Ti	1047(4)	$0.042(^{+26}_{-23})$**	$6.3(^{+39}_{-35})$**	$7.8(^{+94}_{-30})$**	$0.18(^{+5}_{-6})$**	
^{60}Ti	866(5)					
^{46}Cr	892.16(10)	0.093(20)	19.0(41)	16.7(36)	0.288(31)	
^{48}Cr	752.19(11)	0.137(15)	26.4(29)	12.4(14)	0.340(19)	0.136(21)
^{50}Cr	783.30(9)	0.1052(32)	19.23(58)	$13.15(^{+41}_{-29})$	0.2897(44)	0.108(6)
		0.1030(32)*	18.83(58)*	$13.43(^{+68}_{-40})$*		
^{52}Cr	1434.094(14)	0.0622(24)	10.79(42)	$1.081(^{+44}_{-40})$	0.2170(42)	0.0660(30)
		0.0623(19)*	10.81(33)*	$1.080(^{+34}_{-32})$*		
^{54}Cr	834.855(3)	0.0853(42)	14.07(70)	$11.79(^{+61}_{-55})$	0.2478(62)	0.0870(40)
		0.0874(38)*	14.42(63)*	$11.51(^{+52}_{-48})$*		
^{56}Cr	1006.61(20)	0.055(19)	8.7(30)	7.1(25)	0.195(34)	
^{58}Cr	880.7(2)	0.097(13)	14.6(19)	$7.9(^{+12}_{-9})$	0.252(16)	
^{60}Cr	646(1)	0.121(15)	17.4(22)	$30.0(^{+42}_{-33})$	0.275(17)	
^{62}Cr	447(4)	0.173(17)	24.7(23)	$132(^{+11}_{-13})$	0.322(16)	
^{64}Cr	430(2)	0.156(40)	20.5(52)	$200(^{+68}_{-40})$	0.299(38)	
^{48}Fe	969.5(5)					
^{50}Fe	765.0(10)					
		0.140(30)*	25.6(55)*	11.1(24)*	0.308(33)*	
^{52}Fe	849.45(10)					
		0.082(10)*	14.2(18)*	11.3(14)*	0.230(14)*	
^{54}Fe	1408.19(19)	0.0608 (31)	10.0(5)	1.21(6)	0.193(5)	0.062(5)
		0.0542(18)*	8.94(30)*	1.36(5)*		
^{56}Fe	846.776(5)	0.0981(20)	15.4(3)	9.56(19)	0.239(2)	0.0980(40)
		0.0954(27)*	15.0(4)*	9.83(28)*		
^{58}Fe	810.7662(20)	0.122(6)	18.3(9)	9.6(5)	0.270(7)	0.1200(40)
		0.0932(76)*	14.0(11)*	12.5(10)*		
^{60}Fe	823.63(15)	0.0938(88)	13.4(13)	11.5(11)	0.224(10)	0.096(18)
^{62}Fe	876.8(3)	$0.102(^{+10}_{-8})$	$14.0(^{+14}_{-11})$	$7.74(^{+67}_{-71})$	$0.228(^{+12}_{-9})$	
^{64}Fe	746.40(10)	$0.173(^{+21}_{-10})$	$22.7(^{+27}_{-13})$	$10.2(^{+6}_{-11})$	$0.291(^{+18}_{-9})$	
^{66}Fe	574.4(10)	0.152(10)	19.2(13)	$42.9(^{+31}_{-27})$	0.2670(90)	
^{68}Fe	522(1)	0.178(22)	21.6(26)	$62.1(^{+86}_{-67})$	0.283(17)	
^{52}Ni	1397(6)					
^{54}Ni	1392.3(4)	0.061(12)	10.0(20)	1.28(25)	0.179(18)	
^{56}Ni	2700.6(7)	0.0453(86)	7.1(13)	0.062(13)	0.151(14)	0.060(12)
		0.0502(70)*	7.9(11)*	0.057(8)*		
^{58}Ni	1454.21(9)	0.0650(12)	9.75(18)	$0.965(^{+18}_{-17})$	0.1768(16)	0.0695(20)
		0.0636(10)*	9.54(16)*	$0.987(^{+14}_{-15})$*	0.1749(15)*	
^{60}Ni	1332.518(5)	0.0916(16)	13.13(23)	1.060(19)	0.2052(19)	0.0933(15)
		0.0886(17)*	12.70(25)*	1.096(21)*	0.2018(19)*	
^{62}Ni	1172.91(9)	0.0889(30)	12.20(41)	2.068(67)	0.1977(18)	0.0890(25)
		0.0881(11)*	12.09(15)*	2.086(26)*	0.1969(13)*	
^{64}Ni	1345.75(5)	0.0674(32)	8.86(42)	1.370(70)	0.1686(40)	0.076(8)
		0.0687(22)*	9.04(28)*	1.345(45)*	0.1702(27)*	
^{66}Ni	1424.8(10)	0.06(1)	7.6(13)	$1.16(^{+23}_{-17})$	0.1558(25)	0.062(9)
^{68}Ni	2034.07(17)	0.0261 (60)	3.17(73)	$0.449(^{+13}_{-8})$	0.101(11)	0.026(6)
^{70}Ni	1259.6(2)	0.086(14)	10.0(16)	1.50(24)	0.179(15)	
^{72}Ni	1096.0(20)					
^{74}Ni	1024(1)	0.064(22)	7.0(24)	$5.6(^{+31}_{-14})$	$0.149(^{+23}_{-29})$	
		0.127(38)**	13.8(41)**	2.86(85)**	0.21(3)**	
^{76}Ni	992(2)					
^{58}Zn	1356(3)					
^{60}Zn	1003.9(2)					

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{62}Zn	954.0(4)	0.1224(59)	16.79(81)	4.22(20)	0.2166(52)	0.124(9)
		0.1224(59)*	16.79(81)*	4.22(20)*		
^{64}Zn	991.56(5)	0.1494(40)	19.65(53)	$2.849(^{+78}_{-74})$	0.2342(32)	0.160(15)
		0.1518(40)*	19.97(52)*	$2.804(^{+75}_{-72})$*		
^{66}Zn	1039.2279(21)	0.1370(33)	17.29(42)	2.458(59)	0.2198(26)	0.135(10)
		0.1389(31)*	17.53(39)*	2.424(54)*		
^{68}Zn	1077.37(4)	0.1199(21)	14.55(25)	2.345(41)	0.2015(17)	0.124(15)
		0.1195(20)*	14.50(25)*	2.352(40)*		
^{70}Zn	884.46(8)	0.1510(80)	17.62(94)	$4.98(^{+28}_{-25})$	0.2218(59)	0.160(14)
		0.1559(80)*	18.20(93)*	$4.82(^{+26}_{-23})$*	0.2254(58)*	
^{72}Zn	652.70(5)	0.188(17)	21.1(19)	$18.3(^{+18}_{-14})$	0.243(11)	
^{74}Zn	605.9(8)	0.195(15)	21.2(16)	$25.6(^{+21}_{-18})$	0.2430(94)	
^{76}Zn	598.68(10)	0.145(18)	15.2(19)	36.6(45)	0.206(12)	
^{78}Zn	730.2(4)	0.077(19)	7.8(19)	25.5(63)	0.147(18)	
^{80}Zn	1492(1)	0.073(9)	7.1(9)	0.76(9)	0.141(9)	
^{62}Ge	964					
^{64}Ge	1128.2 (4)	$0.208(^{+37}_{-27})$	$27.4(^{+49}_{-36})$	3.3(5)	$0.259(^{+23}_{-17})$	
^{66}Ge	956.94(8)	0.134(11)	16.9(14)	$3.79(^{+34}_{-29})$	0.2038(80)	0.099(19)
^{68}Ge	1015.801(16)	$0.1242(^{+80}_{-30})$	$15.07(^{+97}_{-37})$	$3.05(^{+8}_{-18})$	$0.1923(^{+62}_{-24})$	0.143(21)
^{70}Ge	1039.485(22)	0.1790(30)	20.89(35)	1.878(30)	0.2264(19)	0.1760(40)
		0.1786(30)*	20.84(35)*	1.882(30)*	0.2262(19)*	
^{72}Ge	834.011(19)	0.2087(30)	23.46(34)	4.84(7)	0.2400(17)	0.213(6)
		0.2092(30)*	23.52(34)*	4.83(7)*	0.2402(17)*	
^{74}Ge	595.850(6)	0.306(15)	33.1(16)	17.8(9)	0.285(7)	0.300(6)
		0.301(15)*	32.6(16)*	18.0(9)*	0.285(7)*	
^{76}Ge	562.93(3)	0.2735(30)	28.61(31)	26.35(30)	0.2650(15)	0.268(8)
		0.2734(30)*	28.61(31)*	26.35(30)*	0.2650(15)*	
^{78}Ge	619.36(12)	0.222(14)	22.4(14)	$20.1(^{+14}_{-12})$	0.2346(74)	
^{80}Ge	659.15(4)	0.139(27)	13.6(26)	$23.6(^{+57}_{-38})$	0.183(18)	
		0.107(15)*	10.5(15)*	$30.5(^{+51}_{-38})$*	0.160(11)*	
^{82}Ge	1347.51(7)	0.121(15)	11.4(14)	$0.76(^{+11}_{-8})$	0.167(10)	
^{84}Ge	624.3(7)					
^{86}Ge	527					
^{66}Se	929(2)					
^{68}Se	854.2(3)	0.211(29)	25.6(35)	$4.25(^{+68}_{-41})$	$0.236(^{+15}_{-17})$	
^{70}Se	944.52(5)	0.169(11)	19.7(13)	$3.21(^{+22}_{-20})$	0.207(7)	0.38(8)
^{72}Se	862.07(8)	0.1895(79)	21.30(88)	$4.52(^{+20}_{-18})$	0.2152(45)	0.207(25)
^{74}Se	634.74(6)	0.357(20)	38.7(21)	$11.07(^{+64}_{-58})$	0.2902(80)	0.387(8)
^{76}Se	559.102(5)	$0.432(^{+15}_{-6})$	$45.1(^{+16}_{-6})$	$17.28(^{+23}_{-58})$	$0.3133(^{+55}_{-20})$	0.420(10)
^{78}Se	613.727(3)	0.343(12)	34.6(12)	13.66(47)	0.2744(49)	0.335(9)
^{80}Se	666.27(7)	0.2521(82)	24.62(80)	12.33(41)	0.2314(38)	0.253(6)
^{82}Se	654.75(16)	0.183(10)	17.3(9)	18.5(10)	0.1939(53)	0.182(5)
^{84}Se	1454.55(8)	0.105(15)	9.61(14)	0.597(85)	0.145(10)	
^{86}Se	704.1(3)					
^{72}Kr	709.72(14)	0.466(65)	52.4(72)	$4.86(^{+78}_{-60})$	0.319(22)	
^{74}Kr	455.61(10)	0.627(31)	68.0(34)	$33.0(^{+17}_{-16})$	0.363(9)	0.84(10)
^{76}Kr	423.96(7)	0.758(26)	79.2(27)	$39.1(^{+14}_{-13})$	0.3920(66)	0.824(24)
^{78}Kr	455.033(23)	0.634(16)	64.0(16)	32.89(85)	0.3524(44)	0.633(39)
^{80}Kr	616.60(10)	0.381(12)	37.2(11)	12.00(37)	0.2686(41)	0.370(21)
^{82}Kr	776.520(3)	$0.2251(^{+67}_{-61})$	$21.28(^{+63}_{-58})$	6.42(19)	$0.2031(^{+30}_{-28})$	0.223(10)
^{84}Kr	881.615(3)	$0.1268(^{+48}_{-27})$	$11.60(^{+44}_{-25})$	$6.04(^{+13}_{-22})$	$0.1500(^{+29}_{-16})$	0.125(6)
^{86}Kr	1564.75(10)	0.1056(95)	9.36(84)	$0.412(^{+41}_{-34})$	0.1347(60)	0.122(10)
^{88}Kr	775.31(4)	0.0895(93)	7.7(8)	$16.3(^{+19}_{-15})$	$0.1222(^{+72}_{-66})$	
^{90}Kr	707.13(5)	$0.154(^{+307}_{-61})$	$12.8(^{+257}_{-51})$	15(10)	$0.158(^{+116}_{-36})$	
^{92}Kr	769.1(5)	0.2073(70)	16.81(57)	$7.30(^{+26}_{-23})$	$0.1805(^{+30}_{-27})$	
^{94}Kr	666.1(3)	0.247(28)	19.5(22)	$12.6(^{+16}_{-13})$	0.194(11)	
^{96}Kr	554.1(5)	0.436(93)	33.4(71)	$17.9(^{+48}_{-31})$	0.254(27)	
^{74}Sr	471(1)					
^{76}Sr	262.3(2)	$1.08(^{+15}_{-12})$	$113(^{+16}_{-13})$	295(37)	$0.443(^{+31}_{-25})$	

(*continued on next page*)

Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{78}Sr	277.60(10)	0.97(10)	98(10)	248($^{+29}_{-23}$)	0.413(21)	1.08(15)
^{80}Sr	385.88(8)	0.909(40)	88.8(39)	52.1($^{+24}_{-22}$)	0.3930(86)	0.959(36)
^{82}Sr	573.54(8)	0.505($^{+29}_{-20}$)	47.8($^{+28}_{-19}$)	12.97($^{+53}_{-71}$)	0.2884($^{+83}_{-57}$)	0.513(20)
^{84}Sr	793.22(6)	0.292(23)	26.7(21)	4.45($^{+38}_{-32}$)	0.2156(84)	0.289(44)
^{86}Sr	1076.68(4)	0.1341(77)	11.89(68)	2.10($^{+13}_{-11}$)	0.1439(41)	0.128(14)
		0.1278(58)*	11.34(52)*	2.21($^{+11}_{-10}$)*	0.1405(32)*	
^{88}Sr	1836.087(8)	0.0903($^{+32}_{-23}$)	7.77($^{+27}_{-19}$)	0.2165($^{+56}_{-74}$)	0.1163($^{+20}_{-15}$)	0.092(5)
		0.0897(24)*	7.72(21)*	0.2179($^{+61}_{-58}$)*	0.1159(16)*	
^{90}Sr	831.68(4)	0.102($^{+44}_{-24}$)	8.5($^{+37}_{-20}$)	10(3)	0.122($^{+26}_{-14}$)	0.113(34)
^{92}Sr	814.98(3)	0.095($^{+68}_{-28}$)	7.7($^{+55}_{-23}$)	12(5)	0.116($^{+41}_{-17}$)	0.114(48)
^{94}Sr	836.9(1)	0.099($^{+66}_{-28}$)	7.8($^{+52}_{-22}$)	10.0(40)	0.117($^{+39}_{-16}$)	0.118(47)
^{96}Sr	814.93(7)	0.231($^{+16}_{-5}$)	17.7($^{+13}_{-4}$)	4.92($^{+10}_{-33}$)	0.1753($^{+62}_{-17}$)	0.24(14)
^{98}Sr	144.225(6)	1.240(61)	92.4(46)	4200(200)	0.4010(99)	1.282(39)
^{100}Sr	129.16(9)	1.22(17)	88(12)	6700($^{+1100}_{-800}$)	0.392(27)	1.42(8)
^{102}Sr	126.0(2)					
^{80}Zr	288.9(2)					
^{82}Zr	407.00(10)	0.91($^{+12}_{-5}$)	86($^{+11}_{-5}$)	39.8($^{+24}_{-46}$)	0.368($^{+24}_{-10}$)	0.91(9)
^{84}Zr	539.92(9)	0.437($^{+25}_{-22}$)	40.0($^{+23}_{-20}$)	20.3(11)	0.2506($^{+72}_{-63}$)	0.438(25)
^{86}Zr	751.75(3)	0.157($^{+36}_{-24}$)	13.9($^{+32}_{-22}$)	10.8(20)	0.148($^{+16}_{-12}$)	0.166(31)
^{88}Zr	1057.03(4)	0.086($^{+11}_{-9}$)	7.39($^{+92}_{-74}$)	3.60(40)	0.1077($^{+67}_{-54}$)	0.26(8)
^{90}Zr	2186.274(15)	0.0627(34)	5.23(28)	0.1302($^{+75}_{-67}$)	0.0907(24)	0.0610(40)
		0.0631(30)*	5.27(25)*	0.1294($^{+64}_{-59}$)*	0.0910(22)*	
^{92}Zr	934.47(5)	0.0800(39)	6.49(31)	7.15($^{+36}_{-33}$)	0.1009(24)	0.083(6)
		0.0786(27)**	6.37(22)**	7.29($^{+26}_{-24}$)**	0.1000(17)**	
^{94}Zr	918.75(5)	0.0629(45)	4.96(35)	9.90($^{+76}_{-66}$)	0.0882(31)	0.066(14)
		0.0646(58)**	5.09(46)**	9.65($^{+95}_{-79}$)**	0.0894(40)**	
^{96}Zr	1750.497(15)	0.0314(33)	2.41(26)	0.79(9)	0.0615(33)	0.055(22)
^{98}Zr	1222.92(12)	>0.0093	>0.69	<16	>0.033	
^{100}Zr	212.530(9)	1.110($^{+51}_{-36}$)	80.5($^{+37}_{-26}$)	791($^{+26}_{-35}$)	0.3556($^{+82}_{-57}$)	1.11(6)
^{102}Zr	151.78(11)	1.35(12)	95.4(85)	3000($^{+300}_{-200}$)	0.387(17)	1.66(34)
^{104}Zr	139.3(3)	1.958(100)	134.8(69)	2931($^{+158}_{-143}$)	0.460(12)	
^{106}Zr	152.1	1.55(5)	104.0(33)	2600($^{+200}_{-150}$)	0.36(1)	
^{108}Zr	173.7					
^{84}Mo	443.9(2)					
^{86}Mo	566.6(4)					
^{88}Mo	740.54(4)					
^{90}Mo	947.97(2)					
^{92}Mo	1509.51(3)	0.0975(43)	7.90(35)	0.534($^{+24}_{-22}$)	0.1061(23)	0.097(6)
^{94}Mo	871.098(16)	0.2072(74)	16.32(58)	3.92($^{+14}_{-13}$)	0.1525(27)	0.2030(40)
^{96}Mo	778.237(10)	0.2775(59)	21.26(45)	5.15(11)	0.1740(19)	0.271(5)
^{98}Mo	787.384(13)	0.2695(57)	20.09(43)	5.00(11)	0.1692(18)	0.267(9)
^{100}Mo	535.561(22)	0.530(22)	38.4(16)	17.41($^{+77}_{-71}$)	0.2340(49)	0.516(10)
^{102}Mo	296.610(4)	0.976($^{+49}_{-40}$)	69.0($^{+35}_{-28}$)	177.7($^{+76}_{-86}$)	0.3135($^{+79}_{-64}$)	0.963(31)
^{104}Mo	192.19(9)	1.28(11)	87.8(75)	1095($^{+102}_{-86}$)	0.354(15)	1.34(8)
^{106}Mo	171.549(8)	1.290(65)	86.6(44)	1817($^{+97}_{-87}$)	0.351(9)	1.31(7)
^{108}Mo	192.79(15)	1.74(46)	114(30)	793($^{+281}_{-166}$)	0.403($^{+50}_{-57}$)	1.6(5)
^{110}Mo	213.7(3)					
^{88}Ru	616.2*					
^{90}Ru	738.00(10)*					
^{92}Ru	864.6(10)*					
^{94}Ru	1430.71(20)					
^{96}Ru	832.56(5)	0.2379(65)	18.22(50)	4.28($^{+12}_{-11}$)	0.1538(21)	0.251(10)
^{98}Ru	652.44(4)	0.401(13)	29.89(97)	8.59($^{+29}_{-27}$)	0.1970(32)	0.392(12)
^{100}Ru	539.510(10)	0.4927(41)	35.74(30)	18.05(15)	0.21539(90)	0.490(5)
^{102}Ru	475.0962(10)	0.632(12)	44.68(88)	26.50(53)	0.2408(24)	0.630(10)
^{104}Ru	358.02(7)	0.826(17)	56.9(12)	82.8(17)	0.2717(28)	0.820(12)
^{106}Ru	270.07(4)	1.074(95)	72.1(64)	255($^{+25}_{-21}$)	0.306(14)	0.77(20)
^{108}Ru	242.23(4)	0.894($^{+80}_{-58}$)	58.6($^{+52}_{-38}$)	518($^{+36}_{-43}$)	0.276($^{+12}_{-9}$)	1.01(15)

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{110}Ru	240.71(10)	1.071(61)	68.4(39)	447(25)	0.2980(85)	1.05(12)
^{112}Ru	236.66(17)	1.107(96)	69.0(60)	469(41)	0.299(13)	1.17(23)
^{114}Ru	265.19(17)					
^{116}Ru	292.43(21)					
^{118}Ru	327.6(3)					
^{92}Pd	873.6(2)*					
^{94}Pd	813.8(1)*					
^{96}Pd	1415.31(10)					
^{98}Pd	862.89(10)	>0.0523	>3.897	<16.3	>0.06804	
^{100}Pd	665.50(10)	$0.347(^{+16}_{-15})$	$25.1(^{+12}_{-11})$	9.0(4)	$0.1728(^{+40}_{-38})$	
^{102}Pd	556.44(5)	0.460(23)	32.5(16)	16.57(83)	0.1965(49)	0.460(30)
^{104}Pd	555.81(4)	0.529(15)	36.4(10)	14.48(40)	0.2080(29)	0.535(35)
		0.529(15)*	36.4(10)*	14.48(40)*		
^{106}Pd	511.850(23)	0.660(17)	44.3(12)	$17.50(^{+48}_{-45})$	0.2294(30)	0.660(35)
		0.646(15)*	43.3(10)*	17.89(42)*	0.2269(26)*	
^{108}Pd	433.938(4)	0.764(20)	50.0(13)	34.42(90)	0.2437(33)	0.760(40)
		0.778(17)*	50.9(11)*	33.79(71)*	0.2459(26)*	
^{110}Pd	373.80(6)	0.865(23)	55.3(15)	63.7(17)	0.2562(34)	0.870(40)
		0.861(20)*	55.0(13)*	64.0(14)*	0.2556(29)*	
^{112}Pd	348.79(17)	$0.64(^{+13}_{-9})$	$40.1(^{+79}_{-57})$	121(20)	$0.218(^{+22}_{-15})$	0.66(11)
^{114}Pd	332.50(24)	$0.83(^{+17}_{-12})$	$51(^{+10}_{-7})$	118(20)	$0.245(^{+25}_{-18})$	0.38(12)
^{116}Pd	340.26(8)	$0.57(^{+22}_{-13})$	$34(^{+13}_{-8})$	153(43)	$0.201(^{+39}_{-23})$	0.62(18)
^{118}Pd	378.6(1)*					
^{120}Pd	438(1)					
^{122}Pd	499(9)					
^{124}Pd	590(11)					
^{126}Pd	686(17)					
^{128}Pd	1311.4					
^{98}Cd	1394.7(3)*					
^{100}Cd	1004.11(10)	0.33(2)	23.9(15)	1.211(73)	0.1616(49)	
^{102}Cd	776.55(14)	0.257(23)	18.2(16)	$5.61(^{+55}_{-46})$	0.1407(64)	
^{104}Cd	658.00(20)	0.341(40)	23.5(28)	$9.7(^{+13}_{-10})$	0.160(10)	0.41(11)
^{106}Cd	632.64(4)	0.407(12)	27.32(83)	9.86(30)	0.1726(26)	0.410(20)
^{108}Cd	632.988(15)	0.419(14)	27.45(91)	$9.55(^{+33}_{-31})$	0.1730(29)	0.430(20)
^{110}Cd	657.7645(20)	0.426(21)	27.2(13)	$7.77(^{+40}_{-37})$	0.1723(43)	0.450(20)
		0.4283(93)*	27.36(59)*	$7.71(^{+18}_{-16})$*	0.1728(19)*	
^{112}Cd	617.520(10)	0.501(22)	31.3(14)	$9.04(^{+41}_{-38})$	0.1847(40)	0.510(20)
		0.502(22)*	31.3(14)*	$9.02(^{+41}_{-38})$*	0.1848(40)*	
^{114}Cd	558.456(2)	0.536(25)	32.7(15)	$13.94(^{+68}_{-62})$	0.1888(44)	0.545(20)
		0.536(25)*	32.7(15)*	$13.94(^{+68}_{-62})$*	0.1888(44)*	
^{116}Cd	513.490(15)	0.580(26)	34.5(16)	$19.59(^{+91}_{-89})$	0.1940(44)	0.560(20)
		0.575(26)*	34.2(16)*	$19.76(^{+93}_{-86})$*	0.1932(44)*	
^{118}Cd	487.77(8)	0.578(44)	33.6(26)	25.4(19)	0.1915(73)	0.568(44)
^{120}Cd	505.94(17)	0.473(55)	26.9(31)	25.9(30)	0.171(10)	0.48(6)
^{122}Cd	569.45(8)	0.44(20)	24.5(111)	$15.4(^{+129}_{-48})$	$0.163(^{+34}_{-42})$	0.58(27)
^{124}Cd	612.8(4)	0.35(19)	19.1(10)	$13.4(^{+8}_{-7})$	0.144(4)	
^{126}Cd	652.0(9)*	0.263(60)	14.0(32)	$13.1(^{+39}_{-24})$	0.124(14)	
^{128}Cd	645.8(2)*					
^{130}Cd	1325(1)*					
^{102}Sn	1472*					
^{104}Sn	1260.1(3)	0.176(28)	12.1(19)	$0.73(^{+14}_{-10})$	$0.1104(^{+84}_{-92})$	
^{106}Sn	1207.7(5)	0.209(33)	14.0(22)	0.76(12)	0.1187(94)	
^{108}Sn	1206.07(10)	0.224(16)	14.7(11)	0.713(52)	0.1214(44)	
^{110}Sn	1211.88(15)	0.231(18)	14.7(11)	0.676(52)	0.1217(47)	
^{112}Sn	1256.85(7)	0.232(11)	14.49(68)	$0.560(^{+28}_{-25})$	0.1207(29)	0.240(14)
^{114}Sn	1299.907(7)	0.215(13)	13.10(79)	$0.511(^{+33}_{-29})$	0.1147(34)	0.24(5)
^{116}Sn	1293.560(8)	0.2062(50)	12.27(30)	$0.546(^{+14}_{-13})$	0.1110(14)	0.209(6)
		0.2066(50)*	12.30(30)*	0.545(134)*	0.1112(14)*	
^{118}Sn	1229.666(16)	0.2070(40)	12.04(23)	$0.701(^{+14}_{-13})$	0.1100(10)	0.209(8)

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
		0.2041(40)*	11.87(23)*	0.711(14)*	0.1092(11)*	
^{120}Sn	1171.265(15)	0.1975(24)	11.24(13)	0.937(12)	0.1063(7)	0.2020(40)
		0.1967(30)*	11.19(17)*	0.940(15)*	0.1061(8)*	
^{122}Sn	1140.51(3)	0.1887(45)	10.50(25)	1.120(27)	0.1027(13)	0.1920(40)
^{124}Sn	1131.739(17)	0.1622(40)	8.83(22)	1.354(33)	0.0942(12)	0.1660(40)
		0.1626(40)*	8.85(22)*	1.351(33)*	0.0943(12)*	
^{126}Sn	1141.15(4)	0.1269(73)	6.76(39)	1.66($^{+10}_{-9}$)	0.0825(24)	
^{128}Sn	1168.82(4)	0.0771(38)	4.03(20)	2.42($^{+13}_{-11}$)	0.0636(16)	
^{130}Sn	1221.26(5)	0.023(5)	1.18(26)	6.5(14)	0.0344(37)	
^{132}Sn	4041.20(15)	0.118(26)	5.9(13)	0.00321(71)	0.0771(85)	
^{134}Sn	725.6	0.029(5)	1.42(28)	69.8($^{+145}_{-103}$)	0.0378(34)	
^{136}Sn	688					
^{138}Sn	715					
^{106}Te	664.8(3)*					
^{108}Te	625.20(20)	0.387($^{+52}_{-41}$)	25.3($^{+34}_{-27}$)	11.0(13)	0.153($^{+10}_{-8}$)	
^{110}Te	657.70(9)					
^{112}Te	689.01(2)	0.46(4)	28.7(25)	5.7(5)	0.163(7)	
^{114}Te	708.74(15)	0.556($^{+49}_{-41}$)	33.9($^{+30}_{-25}$)	4.09(33)	0.1774($^{+78}_{-65}$)	
^{116}Te	678.92(3)					
^{118}Te	605.706(20)	0.57($^{+11}_{-8}$)	32.9($^{+62}_{-45}$)	8.8(14)	0.175($^{+17}_{-12}$)	
^{120}Te	560.438(20)	0.685(33)	38.97(88)	10.71($^{+54}_{-49}$)	0.1903(46)	0.77(16)
^{122}Te	564.094(16)	0.650(30)	36.2(17)	10.93($^{+52}_{-49}$)	0.1834(44)	0.660(6)
^{124}Te	602.7271(21)	0.560(28)	30.5(15)	9.12($^{+48}_{-44}$)	0.1684(42)	0.568(6)
^{126}Te	666.352(10)	0.4738(93)	25.26(50)	6.53(13)	0.1532(15)	0.475(10)
^{128}Te	743.219(7)	0.3800(71)	19.83(37)	4.724(88)	0.1358(13)	0.383(6)
^{130}Te	839.494(17)	0.296(10)	15.12(51)	3.30($^{+12}_{-11}$)	0.1185(20)	0.295(7)
^{132}Te	974.22(9)	0.207(17)	10.39(86)	2.24($^{+20}_{-17}$)	0.0983(41)	
^{134}Te	1279.11(10)	0.1034(40)	5.08(20)	1.152($^{+46}_{-53}$)	0.0687(13)	
^{136}Te	606.64(5)	0.122(18)	5.87(87)	40.5($^{+70}_{-52}$)	0.0739(55)	
^{138}Te	443.1(10)*					
^{110}Xe	469.7(2)*					
^{112}Xe	466.0(2)*					
^{114}Xe	450.08(19)	0.971(58)	59.1(35)	22.5($^{+14}_{-13}$)	0.2257(67)	0.93(6)
^{116}Xe	393.6(2)	1.211(61)	72.1(36)	35.1(18)	0.2492(63)	1.21(6)
^{118}Xe	337.32(13)	1.383($^{+48}_{-42}$)	80.4($^{+28}_{-24}$)	65.6(22)	0.2633($^{+45}_{-40}$)	1.40(7)
^{120}Xe	332.61(4)	1.739(110)	98.9(63)	65.2($^{+44}_{-39}$)	0.2920(94)	1.73(11)
^{122}Xe	331.28(7)	1.349(68)	75.1(38)	73.6($^{+39}_{-35}$)	0.2544(64)	1.40(6)
^{124}Xe	354.04(4)	1.072(44)	58.4(24)	66.8($^{+29}_{-26}$)	0.2243(46)	0.96(6)
^{126}Xe	388.631(9)	0.826(60)	44.1(32)	54.7($^{+43}_{-37}$)	0.1949(70)	0.770(25)
^{128}Xe	442.911(9)	0.790(38)	41.2(20)	29.9($^{+15}_{-14}$)	0.1885(46)	0.750(40)
^{130}Xe	536.068(6)	0.634(29)	32.4(15)	14.43($^{+60}_{-63}$)	0.1671(39)	0.65(5)
^{132}Xe	667.715(2)	0.468(24)	23.5(12)	6.54($^{+34}_{-33}$)	0.1422(36)	0.460(30)
^{134}Xe	847.041(23)	0.317(18)	15.57(88)	2.95($^{+17}_{-16}$)	0.1158(33)	0.34(6)
^{136}Xe	1313.027(10)	0.217(33)	10.5(16)	0.481($^{+86}_{-64}$)	0.0949(75)	0.36(6)
^{138}Xe	588.827(18)	0.38(10)	17.9(47)	15.1(40)	0.124(16)	
^{140}Xe	376.658(15)	0.522(40)	24.2(18)	101.0($^{+84}_{-72}$)	0.144(6)	0.324(14)
^{142}Xe	287.20(20)	0.69(10)	31.4(45)	289(42)	0.164(12)	
^{144}Xe	252.6*	0.73(17)	32.6(76)	507($^{+154}_{-96}$)	0.168(20)	
^{118}Ba	194*					
^{120}Ba	186(1)*					
^{122}Ba	195.90(20)	2.34(22)	130(12)	510($^{+54}_{-44}$)	0.323(15)	2.81(28)
^{124}Ba	229.91(10)	2.096(78)	114.1(43)	275($^{+11}_{-10}$)	0.3024(56)	2.09(10)
^{126}Ba	256.02(6)	1.740(80)	92.8(43)	198.2($^{+96}_{-87}$)	0.2726(63)	1.75(9)
^{128}Ba	284.00(8)	0.983($^{+52}_{-35}$)	51.3($^{+27}_{-18}$)	146.1($^{+54}_{-74}$)	0.2027($^{+54}_{-36}$)	1.48(7)
^{130}Ba	357.38(8)	1.138(46)	58.2(24)	60.0($^{+25}_{-23}$)	0.2159(44)	1.163(16)
^{132}Ba	464.508(12)	0.847(57)	42.4(29)	22.0(15)	0.1844(62)	0.86(6)
^{134}Ba	604.7223(19)	0.665(19)	32.63(95)	7.55(22)	0.1617(23)	0.658(7)
^{136}Ba	818.497(11)	0.413(11)	19.87($^{+54}_{-53}$)	2.684(73)	0.1262(17)	0.410(8)
^{138}Ba	1435.816(10)	0.230(11)	10.87(52)	0.290($^{+15}_{-13}$)	0.0933(23)	0.230(9)

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
		0.233(11)*	11.00(48)*	$0.287(^{+14}_{-13})$*	0.0939(23)*	
^{140}Ba	602.36(3)	0.484(38)	22.4(18)	$10.57(^{+90}_{-77})$	0.1340(52)	0.45(19)
^{142}Ba	359.597(14)	0.676(35)	30.7(16)	$97.9(^{+54}_{-48})$	0.1569(41)	0.699(37)
^{144}Ba	199.326(6)	1.012(55)	45.2(25)	$1092(^{+63}_{-56})$	0.1902(52)	1.05(6)
^{146}Ba	181.05(5)	1.350(68)	59.1(29)	$1252(^{+66}_{-60})$	0.2177(55)	1.355(48)
^{148}Ba	141.8(1)					
^{122}Ce	136.4(5)					
^{124}Ce	141.90(20)	$3.50(^{+100}_{-63})$	$190(^{+54}_{-34})$	1270(280)	$0.377(^{+50}_{-36})$	3.7(9)
^{126}Ce	169.59(3)	3.65(46)	195(25)	$603(^{+87}_{-67})$	0.381(24)	2.68(48)
^{128}Ce	207.09(18)	2.27(13)	118.5(68)	405(23)	0.2975(85)	2.28(22)
^{130}Ce	253.85(16)	1.755(79)	89.7(40)	$203.8(^{+96}_{-88})$	0.2589(59)	1.74(10)
^{132}Ce	325.34(8)	1.69(11)	84.7(55)	$63.9(^{+44}_{-39})$	0.2515(84)	1.87(17)
^{134}Ce	409.20(10)	1.062(85)	52.1(42)	32.9(26)	0.1974(79)	1.04(9)
^{136}Ce	552.20(11)	0.81(9)	39.0(43)	9.7(11)	0.1707(95)	0.81(9)
^{138}Ce	788.744(8)	0.467(10)	22.0(5)	2.85(6)	0.1283(14)	0.450(30)
^{140}Ce	1596.237(25)	0.300(15)	13.88(70)	$0.1313(^{+69}_{-63})$	0.1018(25)	0.298(6)
		0.3016(80)*	13.97(37)*	$0.1305(^{+35}_{-34})$*	0.1022(14)*	
^{142}Ce	641.282(9)	0.4572(50)	20.8(2)	8.2(1)	0.1245(7)	0.480(6)
		0.4572(50)*	20.8(2)*	8.2(1)*	0.1245(7)*	
^{144}Ce	397.441(9)	$0.96(^{+30}_{-18})$	$43(^{+13}_{-8})$	42(10)	$0.179(^{+28}_{-17})$	0.83(9)
^{146}Ce	258.46(3)	0.97 (11)	42.5(48)	$339(^{+43}_{-35})$	0.178(10)	1.14(12)
^{148}Ce	158.467(5)	2.02(11)	86.9(47)	$1437(^{+83}_{-74})$	0.2548(69)	1.96(18)
^{150}Ce	97.1	3.18(48)	134(20)	4530(680)	0.317(24)	3.3(8)
^{152}Ce	81.7	$5.9(^{+15}_{-10})$	$246(^{+61}_{-41})$	3608(722)	$0.429(^{+51}_{-37})$	
^{128}Nd	133.66(7)					
^{130}Nd	159.05(14)	3.9(16)	199(81)	720(300)	0.373(77)	4.1(18)
^{132}Nd	213.16(12)	3.58(59)	179(30)	$224(^{+44}_{-32})$	0.354(29)	3.5(6)
^{134}Nd	294.17(16)	$1.879(^{+58}_{-46})$	$92.3(^{+28}_{-23})$	$93.4(^{+24}_{-28})$	$0.2538(^{+39}_{-31})$	1.83(37)
^{136}Nd	373.72(16)	1.66(23)	80(11)	32.9(46)	0.236(16)	
^{138}Nd	520.85(17)					
^{140}Nd	773.73(6)	0.72(5)	33.3(23)	$2.04(^{+15}_{-13})$	0.1526(53)	
^{142}Nd	1575.781(10)	0.265(13)	12.05(58)	$0.1583(^{+82}_{-72})$	0.0917(23)	0.265(6)
		0.272(13)*	12.36(59)*	$0.1543(^{+77}_{-70})$*	0.0929(21)*	
^{144}Nd	696.561(10)	0.504(15)	22.48(67)	4.92(15)	0.1253(19)	0.491(5)
		0.498(14)*	22.22(62)*	4.98(14)*		
^{146}Nd	453.77(5)	0.748(22)	32.76(96)	27.90(82)	0.1512(22)	0.760(25)
		0.705(22)*	30.88(96)*	29.61(92)*		
^{148}Nd	301.702(16)	1.338(30)	57.5(13)	116.1(26)	0.2004(22)	1.35(5)
^{150}Nd	130.21(8)	2.707(30)	114.4(13)	2168(24)	0.2825(16)	2.760(40)
		2.697(30)*	113.9(13)*	2176(24)*		
^{152}Nd	72.51(19)	4.10(22)	170.2(91)	6100(330)	0.3447(92)	4.20(28)
^{154}Nd	70.8(1)	$2.35(^{+82}_{-49})$	$96(^{+33}_{-20})$	11111(2886)	$0.258(^{+42}_{-58})$	
^{156}Nd	66.9					
^{130}Sm	122(3)					
^{132}Sm	131(1)					
^{134}Sm	163	4.14(34)	203(17)	605(50)	0.365(15)	4.2(6)
^{136}Sm	254.92(16)	$2.71(^{+28}_{-23})$	$130(^{+13}_{-11})$	128(12)	$0.292(^{+15}_{-12})$	2.73(27)
^{138}Sm	346.75(20)	1.30(19)	61.4(90)	60.3(88)	0.200(15)	1.41(23)
^{140}Sm	530.68(10)	$1.053(^{+75}_{-65})$	$48.8(^{+35}_{-30})$	9.1(6)	0.179(6)	
^{142}Sm	768.0(2)	0.70(9)	32(4)	$2.17(^{+32}_{-25})$	0.144(9)	
^{144}Sm	1660.027(10)	0.259(19)	11.55(85)	$0.1249(^{+99}_{-86})$	0.0869(32)	0.262(6)
^{146}Sm	747.115(13)	$0.24(_{-7})$	$10.5(_{-31})$	$7.3(^{+30}_{-73})$	$0.083(_{-12})$	
^{148}Sm	550.255(8)	0.713(35)	30.7(15)	$11.23(^{+58}_{-53})$	0.1416(35)	0.720(30)
		0.724(35)*	31.1(15)*	$11.06(^{+56}_{-51})$*	0.1426(35)*	
^{150}Sm	333.863(9)	1.347(26)	56.9(11)	70.1(14)	0.1929(19)	1.350(30)
		1.345(24)*	56.8(10)*	70.2(13)*		
^{152}Sm	121.7817(3)	3.4611(21)	143.67(8)	2042.7(16)	0.3065(1)	3.46(6)
		3.4611(21)*	143.67(8)*	2042.7(16)*	0.3065(1)*	
^{154}Sm	81.981(15)	4.345(44)	177.2(18)	4327(44)	0.3404(17)	4.36(5)

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
		4.347(43)*	177.3(18)*	4325(43)*	0.3405(16)*	
^{156}Sm	75.89(5)	<7.2	<289	>3000	<0.434	
^{158}Sm	72.8					
^{160}Sm	70.9					
^{138}Gd	220.79(20)	2.18(13)	102.9(61)	307.5($^{+195}_{-173}$)	0.2513(77)	
^{140}Gd	328.6(3)					
^{142}Gd	515.37(8)					
^{144}Gd	743.00(17)					
^{146}Gd	1971.97(22)	>0.014	>0.60	<1	>0.019	
^{148}Gd	784.432(15)	0.228($^{+114}_{-55}$)	9.8($^{+45}_{-24}$)	6.0(19)	0.078($^{+16}_{-10}$)	
^{150}Gd	638.045(14)					
^{152}Gd	344.2789(12)	1.655(65)	68.7(27)	49.0(19)	0.2053(40)	1.67(14)
^{154}Gd	123.0709(9)	3.872(16)	157.95(65)	1706.9(71)	0.3113(7)	3.89(7)
		3.872(16)*	157.95(65)*	1706.9(71)*	0.3113(7)*	
^{156}Gd	88.970(1)	4.70(11)	188.3(44)	3194($^{+77}_{-73}$)	0.3399(40)	4.64(5)
		4.70(11)*	188.3(44)*	3195($^{+77}_{-73}$)*	0.3399(40)*	
^{158}Gd	79.5128(15)	5.09(11)	200.8(43)	3638($^{+23}_{-20}$)	0.3510(38)	5.02(5)
^{160}Gd	75.26(1)	5.183(13)	200.91(50)	3915.9(98)	0.35109(44)	5.25(6)
^{162}Gd	71.6	5.50(11)	209.9($^{+43}_{-41}$)	3980(80)	0.3588($^{+36}_{-34}$)	
^{164}Gd	73.3(2)	5.29($^{+28}_{-25}$)	198($^{+11}_{-9}$)	4000(200)	0.3489($^{+92}_{-82}$)	
^{166}Gd	70(1)					
^{140}Dy	202.20(20)					
^{142}Dy	315.9(4)					
^{144}Dy	492.5(3)					
^{146}Dy	682.9(3)					
^{148}Dy	1677.3					
^{150}Dy	803					
^{152}Dy	613.82(7)	0.43(23)	17.8(95)	10.8(58)	0.101(27)	0.43(23)
^{154}Dy	334.34(3)	2.42(12)	98.8(49)	38.6($^{+20}_{-18}$)	0.2387(59)	2.39(13)
^{156}Dy	137.77(8)	3.72(12)	149.2(48)	1194(39)	0.2933(47)	3.710(40)
^{158}Dy	98.9180(10)	4.66(11)	183.7(43)	2421(57)	0.3255(38)	4.66(5)
^{160}Dy	86.7878(3)	5.049(40)	195.7(16)	2916(233)	0.3360(13)	5.13(11)
^{162}Dy	80.661(3)	5.227(84)	199.3(32)	3203($^{+52}_{-50}$)	0.3391(27)	5.35(11)
^{164}Dy	73.392(5)	5.616(68)	210.1(26)	3452(42)	0.3486(21)	5.60(5)
^{166}Dy	76.587(1)					
^{168}Dy	74.96(6)					
^{170}Dy	72(?)					
^{144}Er	329(1)					
^{148}Er	646.6(3)					
^{150}Er	1578.87(18)					
^{152}Er	808.27(10)					
^{154}Er	560.8(1)					
^{156}Er	344.51(6)	1.645(80)	66.0(32)	48.9($^{+25}_{-23}$)	0.1893(46)	1.64(7)
^{158}Er	192.15(3)	3.41(13)	134.4(51)	355(14)	0.2703(52)	3.05(24)
^{160}Er	125.8(1)	4.34(15)	168.2(58)	1322(46)	0.3024(52)	4.38(20)
^{162}Er	102.04(3)	5.04(25)	192.2(95)	1966($^{+103}_{-93}$)	0.3232(81)	5.01(6)
^{164}Er	91.38(2)	5.50(12)	206.3(45)	2264(49)	0.3348(37)	5.45(6)
^{166}Er	80.5776(20)	5.748(89)	212.2(33)	2687($^{+42}_{-41}$)	0.3396(26)	5.83(5)
^{168}Er	79.804(1)	5.723(45)	207.9(16)	2741(22)	0.3361(13)	5.79(10)
^{170}Er	78.599(22)	5.838(68)	208.7(24)	2747(32)	0.3368(20)	5.82(10)
^{172}Er	77.0(4)					
^{174}Er	81.6					
^{152}Yb	1531.4(5)					
^{154}Yb	821.3(2)					
^{156}Yb	536.4(1)					
^{158}Yb	358.2(1)	1.84(22)	72.5(87)	36.0(43)	0.193(12)	1.87(23)
^{160}Yb	243.1(1)	2.44(16)	94.6(62)	172(11)	0.2202(72)	2.66(16)
^{162}Yb	166.72(4)	3.47(11)	132.4(42)	609($^{+20}_{-19}$)	0.2606(41)	3.53(15)
^{164}Yb	123.310(23)	4.33(14)	162.4(53)	1345(43)	0.2886(47)	4.38(26)

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{166}Yb	102.37(3)	5.20(20)	191.9(74)	1776(68)	0.3137(60)	5.24(31)
^{168}Yb	87.73(1)	5.75(12)	208.8(44)	$2152(^{+46}_{-44})$	0.324(3)	5.58(30)
^{170}Yb	84.25468(8)	5.721(70)	204.6(25)	2308(28)	0.3239(20)	5.79(13)
^{172}Yb	78.7427(6)	6.09(15)	214.3(53)	$2394(^{+61}_{-58})$	0.3315(41)	6.04(7)
^{174}Yb	76.471(1)	5.85(16)	202.9(56)	$2589(^{+73}_{-69})$	0.3226(44)	5.94(6)
^{176}Yb	82.135(15)	5.189(89)	177.1(30)	2645(45)	0.3014(26)	5.30(19)
^{178}Yb	84.0(3)					
^{154}Hf	1513					
^{156}Hf	858					
^{158}Hf	476.36(11)					
^{160}Hf	389.40(10)					
^{162}Hf	285	1.34(10)	51.1(38)	148(11)	0.1574(59)	1.35(12)
^{164}Hf	210.7(3)	1.82(17)	68.3(64)	435(41)	0.1819(85)	2.14(18)
^{166}Hf	158.64(5)	$3.46(^{+17}_{-15})$	$127.7(^{+63}_{-55})$	717(33)	$0.2488(^{+61}_{-54})$	3.50(20)
^{168}Hf	124.10(5)	4.393(36)	159.58(30)	1239(10)	0.2781(11)	4.30(23)
^{170}Hf	100.80(17)	5.11(18)	182.7(64)	1740(61)	0.2976(52)	5.3(12)
^{172}Hf	95.22(4)	5.77(10)	203.1(35)	$1710(^{+31}_{-39})$	0.314(3)	4.47(33)
^{174}Hf	90.985(19)	5.38(20)	186.5(70)	$1986(^{+77}_{-71})$	0.301(6)	4.88(31)
^{176}Hf	88.349(24)	5.42(17)	184.9(58)	$2069(^{+67}_{-63})$	0.299(5)	5.27(10)
^{178}Hf	93.1803(10)	4.736(63)	159.3(21)	2168(29)	0.2779(18)	4.82(6)
^{180}Hf	93.3243(20)	4.6470(30)	153.953(99)	2203.9(14)	0.273190(88)	4.67(12)
^{182}Hf	97.79(9)					
^{184}Hf	107.1(1)					
^{160}W	609.9(2)					
^{162}W	449.4(3)					
^{164}W	332.7					
^{166}W	252.0(3)					
^{168}W	199.3(2)	3.22(16)	117.0(58)	307(15)	0.2317(58)	3.24(18)
^{170}W	156.72(13)	3.50(17)	125.1(61)	716(35)	0.2396(58)	3.51(10)
^{172}W	123.2(1)	5.363(15)	188.78(53)	979.8(27)	0.29434(41)	5.02(48)
^{174}W	113.0(1)	4.38(35)	152(12)	$1479(^{+128}_{-109})$	0.264(11)	3.97(28)
^{176}W	108.3(7)	4.953(31)	169.1(11)	1431.1(90)	0.27856(87)	
^{178}W	105.90(9)	4.552(58)	153.1(20)	1642(21)	0.2650(17)	
^{180}W	103.531(10)	4.15(14)	137.5(66)	$1879(^{+66}_{-61})$	0.251(5)	4.25(24)
^{182}W	100.10598(7)	4.123(42)	134.6(14)	2014(21)	0.2485(13)	4.20(8)
		4.123(42)*	134.6(14)*	2014(21)*		
^{184}W	111.2174(4)	3.706(35)	119.2(11)	1813(173)	0.2339(11)	3.78(13)
		3.705(35)*	119.2(11)*	1813(17)*	0.2339(11)*	
^{186}W	122.630(15)	3.500(38)	111(12)	1519(16)	0.2257(12)	3.50(12)
^{188}W	143.16(9)	$2.71(^{+42}_{-33})$	$85(^{+14}_{-12})$	1255(173)	$0.198(^{+15}_{-13})$	
^{190}W	207					
^{192}W	219 (?)					
^{162}Os	706.7(3)					
^{164}Os	548.0(2)					
^{166}Os	432.0(3)					
^{168}Os	341.20(20)					
^{170}Os	286.70(14)					
^{172}Os	227.77(9)	$3.28(^{+21}_{-19})$	$115.5(^{+74}_{-67})$	167(10)	$0.2241(^{+72}_{-65})$	3.30(23)
^{174}Os	158.60(10)	$4.55(^{+18}_{-15})$	$157.6(^{+64}_{-51})$	$512(^{+17}_{-20})$	$0.2618(^{+53}_{-43})$	4.7(6)
^{176}Os	135.1(7)	3.20(48)	109(16)	1210(180)	0.218(16)	
^{178}Os	132.20(17)	$4.12(^{+31}_{-25})$	$139(^{+10}_{-9})$	$999(^{+65}_{-69})$	$0.2456(^{+91}_{-75})$	
^{180}Os	132.11(10)	4.07(38)	135(13)	1012(94)	0.242(11)	3.6(8)
^{182}Os	126.89(8)	3.896(85)	127.2(28)	1177(26)	0.2352(26)	3.86(35)
^{184}Os	119.77(9)	3.214(79)	103.4(25)	1645(40)	0.2121(26)	3.23(16)
^{186}Os	137.159(8)	3.064(72)	97.2(23)	$1208(^{+29}_{-28})$	0.2056(34)	2.90(10)
^{188}Os	155.021(11)	2.500(36)	78.2(11)	1007(15)	0.1844(13)	2.55(5)
		2.518(36)*	78.7(11)*	1000(14)*		
^{190}Os	186.718(2)	2.354(90)	72.6(28)	538(22)	0.1777(33)	2.35(6)

(continued on next page)

Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
		2.348(90)*	72.4(28)*	539(22)*	0.1775(36)*	
^{192}Os	205.79442(9)	2.03(10)	61.7(30)	$418(^{+22}_{-20})$	0.1639(40)	2.100(30)
		2.03(10)*	61.6(30)*	$419(^{+22}_{-20})$*	0.1637(40)*	
^{194}Os	218.509(6)					
^{196}Os	324.4(10)					
^{198}Os	465.4(5)					
^{168}Pt	581.40(10)					
^{170}Pt	508.9(10)					
^{172}Pt	457.60(10)					
^{174}Pt	394.2(10)					
^{176}Pt	264.0(3)	2.55(23)	87.1(79)	109.0(98)	0.1896(86)	2.58(28)
^{178}Pt	170.30(10)	$4.24(^{+33}_{-29})$	$143(^{+11}_{-10})$	412(30)	$0.2427(^{+94}_{-84})$	
^{180}Pt	153.21(7)	4.66(43)	154(14)	540(50)	0.253(11)	4.81(49)
^{182}Pt	154.97(9)	$3.46(^{+23}_{-17})$	$113.0(^{+76}_{-54})$	$699(^{+35}_{-44})$	$0.2160(^{+73}_{-52})$	
^{184}Pt	162.98(6)	3.79(20)	121.9(64)	539(28)	0.2244(59)	3.78(27)
^{186}Pt	191.53(4)	3.04(12)	96.4(38)	$368(^{+15}_{-14})$	0.200(4)	2.99(13)
^{188}Pt	265.63(5)	2.60(47)	81(15)	104(19)	0.183(17)	2.69(49)
^{190}Pt	295.80(4)	1.854(90)	57.2(28)	$88.2(^{+45}_{-41})$	0.1537(38)	1.75(22)
^{192}Pt	316.50714(15)	1.940(65)	59.0(20)	$61.1(^{+21}_{-20})$	0.1561(27)	1.870(40)
^{194}Pt	328.464(5)	1.631(68)	48.9(20)	$60.9(^{+27}_{-24})$	0.1421(30)	1.642(22)
		1.632(68)*	48.9(20)*	$60.8(^{+26}_{-24})$*	0.1422(30)*	
^{196}Pt	355.6841(20)	1.401(68)	41.4(20)	$48.3(^{+25}_{-22})$	0.1308(32)	1.375(16)
		1.405(68)*	41.6(20)*	$48.1(^{+25}_{-22})$*	0.1310(32)*	
^{198}Pt	407.22(5)	1.072(50)	31.3(15)	$32.6(^{+16}_{-15})$	0.1137(27)	1.080(12)
^{200}Pt	470.10(20)					
^{202}Pt	534.90(20)					
^{204}Pt	872(1)					
^{172}Hg	672.8(4)					
^{174}Hg	647					
^{176}Hg	613.3(10)					
^{178}Hg	558.00(20)					
^{180}Hg	434.30(10)	1.45(21)	48.0(70)	17.5(25)	0.1373(99)	
^{182}Hg	351.7(3)	1.677(88)	54.8(29)	$42.4(^{+24}_{-21})$	0.1466(38)	
^{184}Hg	366.78(9)	1.623(71)	52.2(25)	$35.7(^{+19}_{-15})$	0.143(3)	2.05(49)
^{186}Hg	405.33(14)	1.47(21)	46.6(66)	$24.3(^{+40}_{-31})$	0.135(10)	1.41(24)
^{188}Hg	412.8(1)	$1.72(^{+27}_{-26})$	53.8(84)	$19.0(^{+26}_{-25})$	0.145(13)	
^{190}Hg	416.32(14)					
^{192}Hg	422.79(10)					
^{194}Hg	427.89(9)					
^{196}Hg	425.98(10)	1.143(82)	33.8(24)	24.5(18)	0.1152(41)	1.15(5)
^{198}Hg	411.80250(17)	0.9612(70)	28.05(20)	$34.34(^{+26}_{-24})$	0.1049(4)	0.990(12)
^{200}Hg	367.943(10)	0.855(28)	24.6(81)	66.8(22)	0.0983(16)	0.853(11)
^{202}Hg	439.512(8)	0.615(21)	17.47(60)	39.0(1)	0.0828(14)	0.612(10)
^{204}Hg	436.552(8)	0.424(21)	11.89(59)	$58.5(^{+31}_{-28})$	0.0683(17)	0.427(7)
		0.4288(44)*	12.02(12)*	$57.84(^{+60}_{-59})$*	0.06871(36)*	
^{206}Hg	1068.20(20)	>0.0000097	>0.00027	<30000	>0.00033	
^{208}Hg	669.0(5)					
^{210}Hg	643					
^{180}Pb	1168(1)					
^{182}Pb	888.3(3)					
^{184}Pb	701.5					
^{186}Pb	662.4(5)	0.190(53)	6.0(17)	16.6(46)	0.0475(66)	
^{188}Pb	723.90(20)	0.255(85)	8.0(27)	8.0(27)	0.0546(91)	
^{190}Pb	773.9(4)					
^{192}Pb	853.64(18)					
^{194}Pb	965.08(15)					
^{196}Pb	1049.20(9)					
^{198}Pb	1063.5(2)					
^{200}Pb	1026.61(14)					

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{202}Pb	960.67(5)	>0.0034	>0.0975	<144.3	>0.006036	
^{204}Pb	899.165(25)	0.1587(69)	4.45(19)	4.34(19)	0.04078(89)	0.1620(40)
		0.1607(64)*	4.51(18)*	4.29(17)*		
^{206}Pb	803.054(25)	0.0989(28)	2.737(77)	12.23(35)	0.03198(45)	0.1000(20)
		0.0987(27)*	2.732(75)*	12.26(34)*		
^{208}Pb	4085.52(4)	0.287(18)	7.84(49)	0.00125(8)	0.0541(17)	0.300(30)
		0.301(16)*	8.22(45)*	0.00119($^{+7}_{-6}$)*	0.0554(15)*	
^{210}Pb	799.7(1)					
		0.051(15)**	1.38(40)**	24.2(71)**	0.0227(33)**	0.051(15)
^{212}Pb	804.9(5)					
^{214}Pb	836(2)					
^{190}Po	233					
^{192}Po	262					
^{194}Po	319.8(3)	2.99($^{+70}_{-48}$)	90($^{+20}_{-14}$)	37(7)	0.179($^{+18}_{-15}$)	
^{196}Po	463.12(9)	1.59(21)	47.0(62)	11.6(15)	0.1294(85)	
^{198}Po	604.94(10)					
		1.30($^{+29}_{-24}$)**	37.9($^{+85}_{-70}$)**	3.80($^{+86}_{-70}$)**	0.116(12)**	
^{200}Po	665.90(10)					
		1.06(6)**	30.5(17)**	2.89($^{+17}_{-15}$)**	0.104(3)**	
^{202}Po	677.20(20)					
		1.12($^{+34}_{-26}$)**	31.8($^{+97}_{-74}$)**	2.52($^{+75}_{-59}$)**	0.106($^{+15}_{-13}$)**	
^{204}Po	684.341(10)					
^{206}Po	700.66(3)					
^{208}Po	686.526(20)					
^{210}Po	1181.40(2)	0.0200(40)	0.54(11)	8.8(18)	0.0138(14)	0.0200(40)
^{212}Po	727.330(9)					
^{214}Po	609.316(4)	>0.794	>20.9	<6	>0.0863	
^{216}Po	549.76(4)					
^{218}Po	509.70(10)					
^{198}Rn	339.0(2)					
^{200}Rn	432.60(20)					
^{202}Rn	504.00(10)	1.00($^{+32}_{-26}$)	28.4($^{+91}_{-84}$)	12.1($^{+43}_{-30}$)	0.098($^{+15}_{-14}$)	
^{204}Rn	542.90(10)	1.51($^{+59}_{-45}$)	42.3($^{+165}_{-126}$)	5.6($^{+24}_{-16}$)	0.120($^{+21}_{-20}$)	
^{206}Rn	575.30(10)					
^{208}Rn	635.8(2)					
^{210}Rn	643.8(1)					
^{212}Rn	1273.8(2)					
^{214}Rn	694.7	>0.0012	>0.033	<2000	>0.0033	
^{216}Rn	461.4(2)					
^{218}Rn	324.320(18)	>0.89	>23	<115	>0.088	
^{220}Rn	240.986(6)	1.872(63)	47.46(60)	210.2($^{+73}_{-68}$)	0.1270(22)	1.86(7)
^{222}Rn	186.211(13)	2.36(15)	59.1(37)	461(32)	0.1417(45)	2.37(16)
^{206}Ra	474.3(5)					
^{208}Ra	520.2(2)					
^{210}Ra	603.5(5)					
^{212}Ra	629.3(1)					
^{214}Ra	1382.3(1)					
^{216}Ra	688.2(2)					
^{218}Ra	388.90(10)	1.00($^{+10}_{-9}$)	25.5($^{+26}_{-22}$)	43.0(40)	0.0910($^{+47}_{-39}$)	1.10(20)
^{220}Ra	178.47(12)					
^{222}Ra	111.12(2)	4.51(36)	113.0(90)	749(69)	0.1915(76)	4.54(39)
^{224}Ra	84.373(3)	3.990(52)	98.8(13)	1078(14)	0.1790(12)	3.99(15)
^{226}Ra	67.67(1)	5.16(13)	126.2(32)	905(35)	0.2024(25)	5.15(14)
^{228}Ra	63.823(20)	5.98(20)	144.7(48)	792(37)	0.2167(36)	5.99(28)
^{230}Ra	57.4(1)					
^{232}Ra	54.5(10)					
^{214}Th	623.0(10)					
^{216}Th	1478.2(1)					
^{218}Th	689.6(6)					

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Table 3 (*continued*)

Nuclide	$E_{2_1^+}$ (keV)	B(E2)↑ (e^2b^2)	B(E2) (W.u.)	τ (ps)	β_2	B(E2)↑ [13] (e^2b^2)
^{220}Th	386.5(1)					
^{222}Th	183.3	2.98(25)	74.6(63)	346(31)	0.1522(64)	3.01(32)
^{224}Th	98.1(3)	3.96($^{+29}_{-25}$)	98.0($^{+72}_{-62}$)	851(58)	0.1744($^{+64}_{-55}$)	
^{226}Th	72.20(4)	6.82(35)	170.9(87)	570(29)	0.2303(59)	6.85(42)
^{228}Th	57.759(4)	7.05(12)	170.3(29)	584(18)	0.2299(19)	7.06(24)
^{230}Th	53.227(11)	8.14(21)	194.5(50)	512($^{+14}_{-13}$)	0.2456(32)	8.04(10)
^{232}Th	49.369(9)	9.02(38)	213.1(90)	470($^{+21}_{-19}$)	0.2571(54)	9.28(10)
^{234}Th	49.55(6)	7.92(64)	185(15)	534(51)	0.2395(97)	8.0(7)
^{236}Th	48.4(SY)					
^{226}U	81.3(6)					
^{228}U	59(14)					
^{230}U	51.727(23)	9.5(11)	227(26)	376(49)	0.260(15)	9.7(12)
^{232}U	47.573(8)	9.91(79)	234(19)	366(34)	0.264(11)	10.0(10)
^{234}U	43.4981(10)	10.22(50)	239(12)	359($^{+19}_{-17}$)	0.2662(66)	10.66(20)
^{236}U	45.2440(20)	10.96(28)	253.1(65)	332.9($^{+87}_{-83}$)	0.2741(35)	11.61(15)
^{238}U	44.916(13)	12.19(62)	278(14)	300($^{+16}_{-15}$)	0.2741(36)	12.09(20)
^{240}U	45(1)					
^{242}U	47.8(SY)					
^{236}Pu	44.63(10)					
^{238}Pu	44.076(18)	12.26(34)	279.9(78)	253.9($^{+73}_{-69}$)	0.2821(39)	12.61(17)
^{240}Pu	42.824(8)	13.13(39)	296.4(88)	238.2($^{+73}_{-69}$)	0.2904(42)	13.02(30)
^{242}Pu	44.54(2)	14.01(75)	312.8(88)	222($^{+13}_{-11}$)	0.2983(80)	13.40(16)
^{244}Pu	44.2(4)	13.61(68)	301(15)	228($^{+12}_{-11}$)	0.2924(73)	13.68(16)
^{246}Pu	46.7(SY)					
^{238}Cm	35(7)					
^{240}Cm	38(5)	14.26(98)	322(22)	190(16)	0.296(10)	14.3(6)
^{242}Cm	42.13(5)					
^{244}Cm	42.965(10)	14.58(73)	322(16)	181.9($^{+95}_{-87}$)	0.2963(74)	14.67(17)
^{246}Cm	42.851(5)	14.94(75)	326(16)	177.5($^{+94}_{-65}$)	0.2983(75)	14.94(19)
^{248}Cm	43.40(3)	14.43(75)	312(16)	183.5($^{+100}_{-91}$)	0.2857(74)	14.99(19)
^{250}Cm	47.8(SY)					
^{244}Cf	41(20)					
^{246}Cf	44(20)					
^{248}Cf	41.53(6)					
^{250}Cf	42.721(5)	16.0(16)	338(34)	141(16)	0.298(15)	16.0(16)
^{252}Cf	45.72(5)	16.7(11)	353(26)	133(11)	0.304(10)	16.7(11)
^{246}Fm	47(SY)					
^{248}Fm	44(10)					
^{252}Fm	46.6(12)					
^{254}Fm	45.000(15)					
^{256}Fm	48.3					
^{252}No	46.4(10)					
^{254}No	44.2(4)					
^{256}Rf	44(1)					

Table 4
Shell model E(2_1^+)-, B(E2)↑-values for even–even nuclei.

Nuclide	E(2_1^+) (MeV)	B(E2)↑ (e^2b^2)	Model space	Effective interaction	Comments
^{6}He	1.894	0.000465	p	CKIHE	[36]
^{10}Be	3.704	0.007	p	PWT	P(5-16) interaction [37]
^{12}Be	3.319	0.005465	p	PWT	
^{10}C	7589	0.0037945	p	PWT	
^{12}C	1443	0.007215	p	PWT	
^{18}O	1.999	0.0016315	sd	USDB	[38]
^{20}O	1.746	0.0020585	sd	USDB	
^{22}O	3.158	0.001984	sd	USDB	
^{18}Ne	1.999	0.001491	sd	USDB	
^{20}Ne	1.7467	0.046	sd	USDB	
^{22}Ne	1.3629	0.0447	sd	USDB	
^{24}Ne	2.1108	0.0363	sd	USDB	
^{26}Ne	2.0633	0.0358	sd	USDB	
^{28}Ne	1.6228	0.0311	sd	USDB	
^{30}Ne					
^{20}Mg	1.7461	0.035	sd	USDB	
^{22}Mg	1.3629	0.06	sd	USDB	
^{24}Mg	1.5023	0.07	sd	USDB	
^{26}Mg	1.8969	0.0605	sd	USDB	
^{28}Mg	1.518	0.0548	sd	USDB	
^{30}Mg	1.5914	0.0443	sd	USDB	
^{24}Si	2.1108	0.0422	sd		
^{26}Si	1.8969	0.0414	sd		
^{28}Si	1.9317	0.0707	sd		
^{30}Si	2.2656	0.0409	sd		
^{32}Si	2.0526	0.0373	sd		
^{34}Si	5.2452	0.0293	sd		
^{36}Si	1.723	0.0271	sdpf	SDPFU	Not very good: shape coexistence [39]
^{38}Si	1.395	0.03575	sdpf	SDPFU	
^{40}Si	1.217	0.0541	sdpf	SDPFU	
^{30}S	2.2656	0.0506	sd		
^{32}S	2.16	0.0413	sd		
^{34}S	2.1314	0.0312	sd		
^{36}S	3.3823	0.0176	sd		
^{38}S	1.459	0.027	sdpf	SDPFU	
^{40}S	0.942	0.0463	sdpf	SDPFU	
^{42}S	0.999	0.0564	sdpf	SDPFU	
^{32}Ar	2.0526	0.0449	sd		
^{34}Ar	2.1314	0.0383	sd		
^{46}Ca	1.2799	0.0047	pf	GXPF1A	[40,41]
^{48}Ca	3.7356	0.0061	pf	GXPF1A	
^{50}Ca	1.1923	0.0047	pf	GXPF1A	
^{44}Ti	1.2874	0.0535	pf	GXPF1A	
^{46}Ti	1.0054	0.0635	pf	GXPF1A	
^{48}Ti	1.01	0.0529	pf	GXPF1A	
^{50}Ti	1.624	0.0511	pf	GXPF1A	
^{52}Ti	1.1064	0.0511	pf	GXPF1A	
^{54}Ti	1.395	0.0519	pf	GXPF1A	
^{56}Ti	1.176	0.052	pf	GXPF1A	
^{46}Cr	1.0054	0.0955	pf	GXPF1A	
^{48}Cr	0.7887	0.1273	pf	GXPF1A	
^{50}Cr	0.7872	0.1107	pf	GXPF1A	
^{52}Cr	1.5101	0.0849	pf	GXPF1A	
^{54}Cr	0.8949	0.1138	pf	GXPF1A	
^{56}Cr	1.0715	0.1109	pf	GXPF1A	
^{58}Cr	0.9062	0.1143	pf	GXPF1A	
^{60}Cr	0.958	0.0972	pf	GXPF1A	
^{62}Cr	0.84	0.0793	pf	GXPF1A	
^{50}Fe	0.787	0.1151	pf	GXPF1A	
^{52}Fe	0.883	0.1124	pf	GXPF1A	
^{54}Fe	1.4483	0.0761	pf	GXPF1A	
^{56}Fe	0.8903	0.1228	pf	GXPF1A	
^{58}Fe	0.8478	0.1468	pf	GXPF1A	
^{60}Fe	0.8173	0.1345	pf	GXPF1A	
^{62}Fe	0.8114	0.1101	pf	GXPF1A	
^{64}Fe	0.9008	0.0784	pf	GXPF1A	
^{54}Ni	1.448	0.0375	pf	GXPF1A	
^{56}Ni	2.599	0.0823	pf	GXPF1A	
^{58}Ni	1.478	0.0599	pf	GXPF1A	
^{60}Ni	1.474	0.0946	pf	GXPF1A	
^{62}Ni	1.149	0.1195	pf	GXPF1A	

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Table 4 (*continued*)

Nuclide	$E(2_1^+)$ (MeV)	B(E2)↑ (e^2b^2)	Model space	Effective interaction	Comments
^{64}Ni	1.268	0.0706	pf	GXPF1A	
^{66}Ni	1.265(1.624)	0.0365(0.0464)		GXPF1A(Jun-45)	
^{68}Ni	1.963	0.0376		Jun-45	
^{70}Ni	1.599	0.0427		Jun-45	
^{72}Ni	1.505	0.0483		Jun-45	
^{74}Ni	1.442	0.044		Jun-45	
^{76}Ni	1.374	0.0296		Jun-45	
^{62}Zn	1.013	0.1479	pf	GXPF1A	
^{64}Zn	0.973	0.1492	pf	GXPF1A	
^{66}Zn	0.95	0.129	pf	GXPF1A	
^{68}Zn	0.879(1.104)	0.0799(1.493)		GXPF1A(Jun-45)	
^{70}Zn	1.109	0.1581		Jun-45	
^{72}Zn	1.007	0.1773		Jun-45	
^{74}Zn	0.966	0.1763		Jun-45	
^{76}Zn	0.976	0.1521		Jun-45	
^{78}Zn	1.045	0.1097		Jun-45	
^{104}Sn	1.496	0.0225	jj55	jj55pn	jj55 model space: 1d5/2,1d3/2,2s1/2,0g7/2,0h11/2 [43]
^{106}Sn	1.414	0.0345	jj55	jj55pn	

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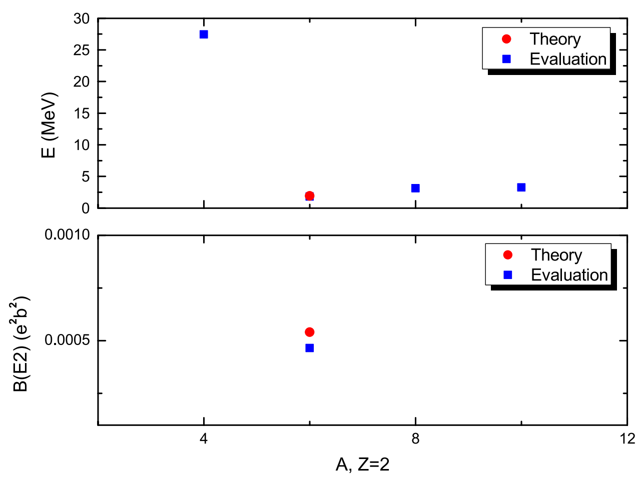
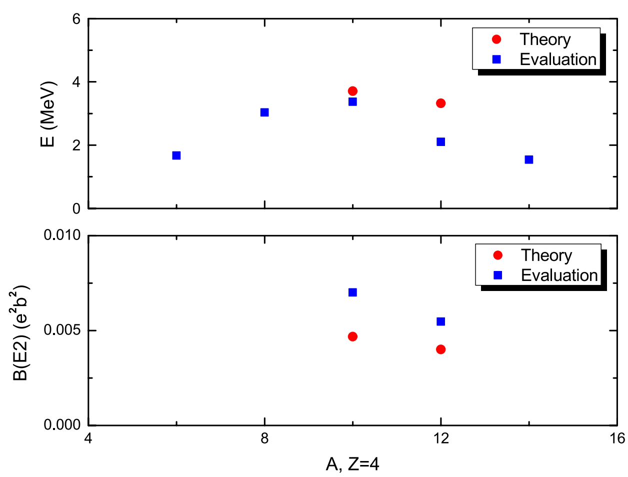
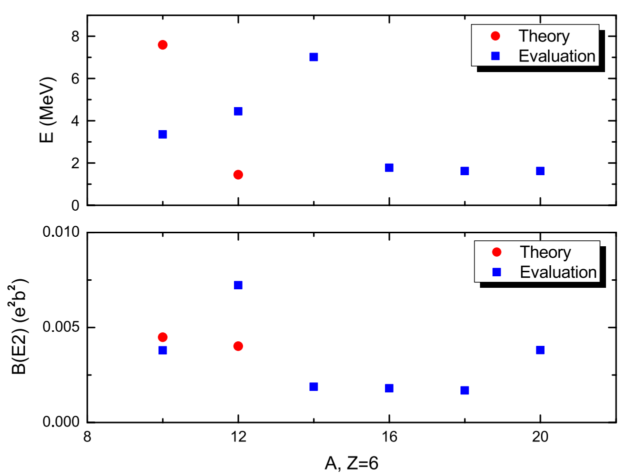


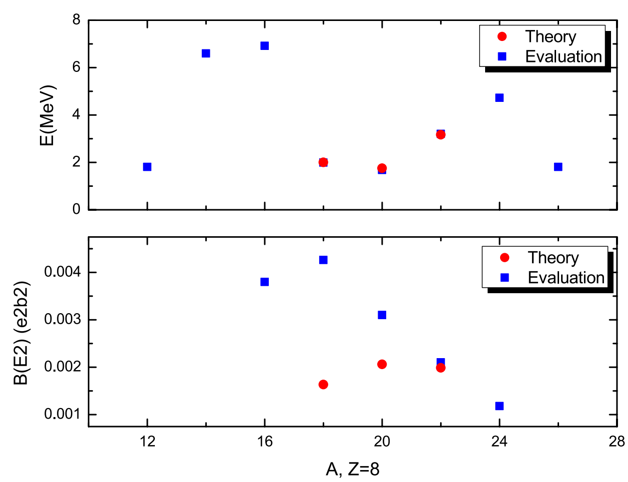
Graph 1. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for He nuclei.



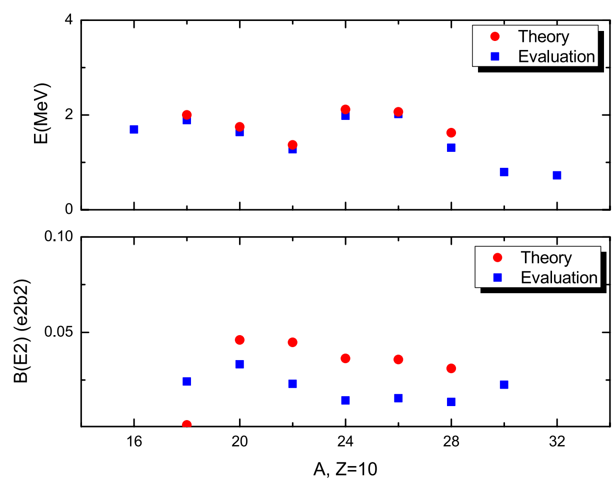
Graph 2. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Be nuclei.



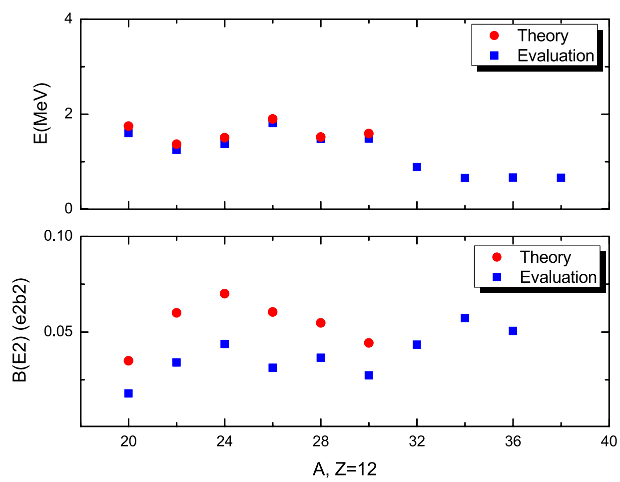
Graph 3. Evaluated and shell model calculated energies, E(2^+_1), and B(E; $0^+_1 \rightarrow 2^+_1$) values for C nuclei.



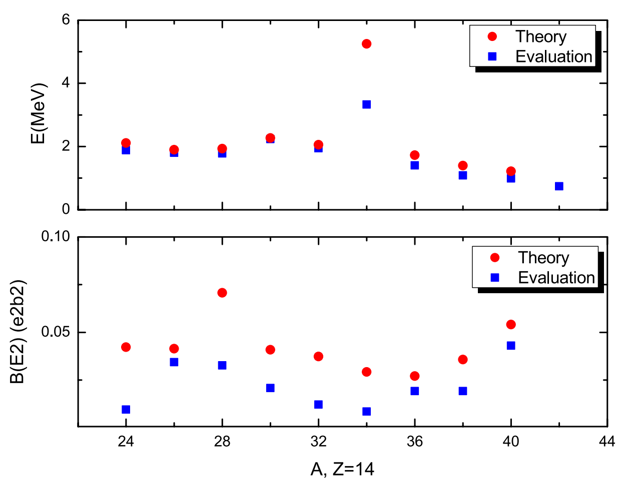
Graph 4. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for O nuclei.



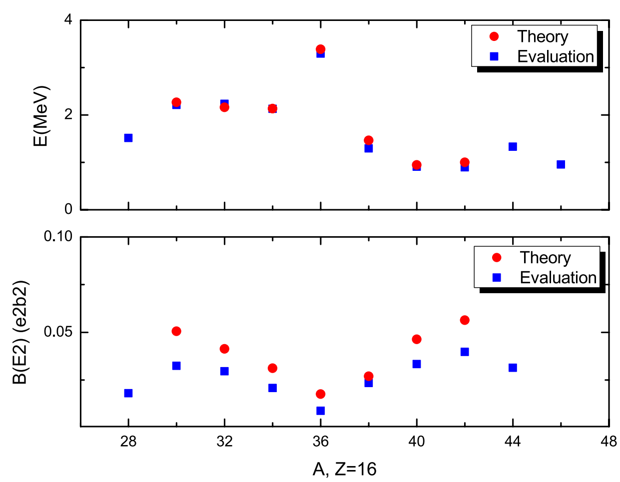
Graph 5. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ne nuclei.



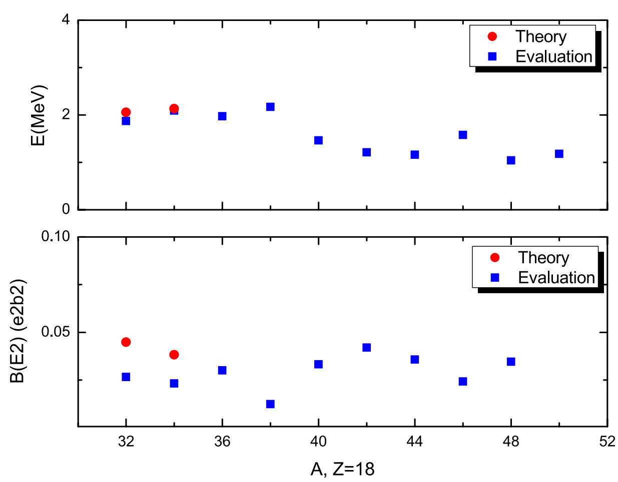
Graph 6. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Mg nuclei.



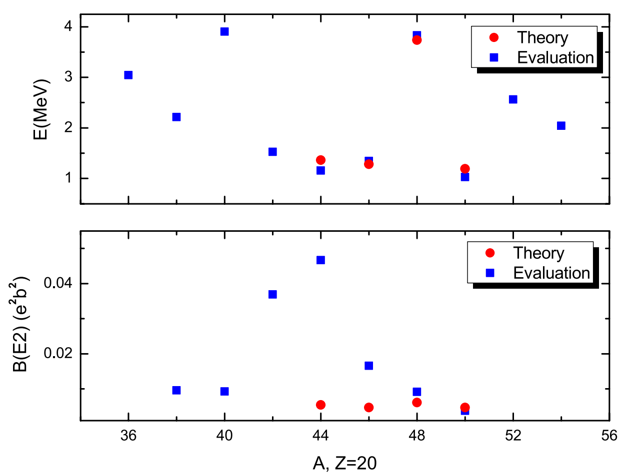
Graph 7. Evaluated and shell model calculated energies, E(2^+_1), and B(E; $0^+_1 \rightarrow 2^+_1$) values for Si nuclei.



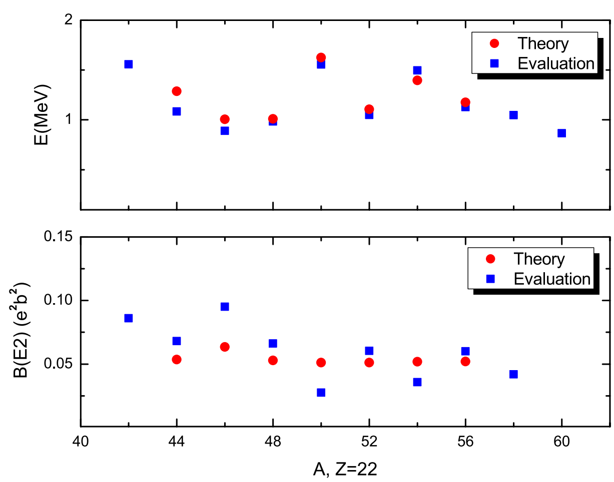
Graph 8. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for S nuclei.



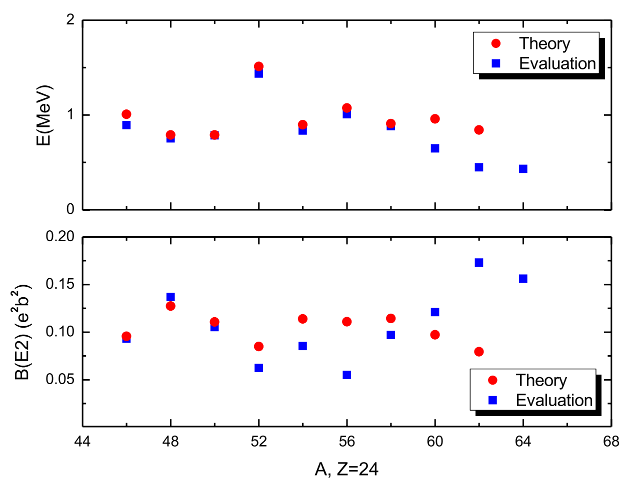
Graph 9. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ar nuclei.



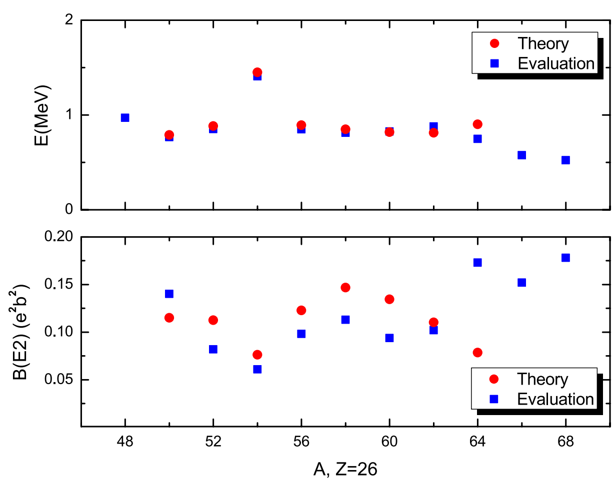
Graph 10. Evaluated and shell model calculated energies, E(2^+_1), and B(E; $0^+_1 \rightarrow 2^+_1$) values for Ca nuclei.



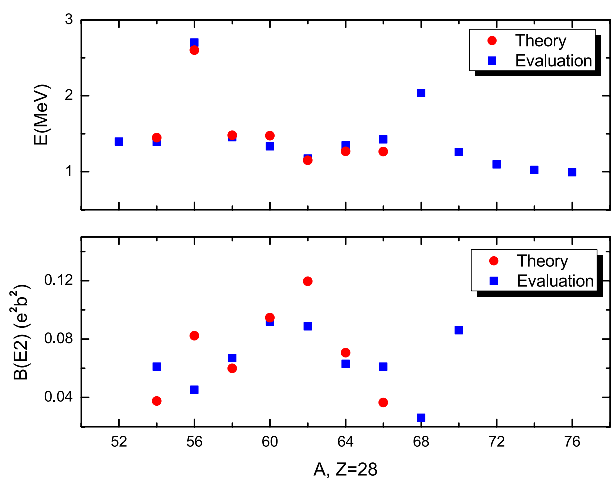
Graph 11. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ti nuclei.



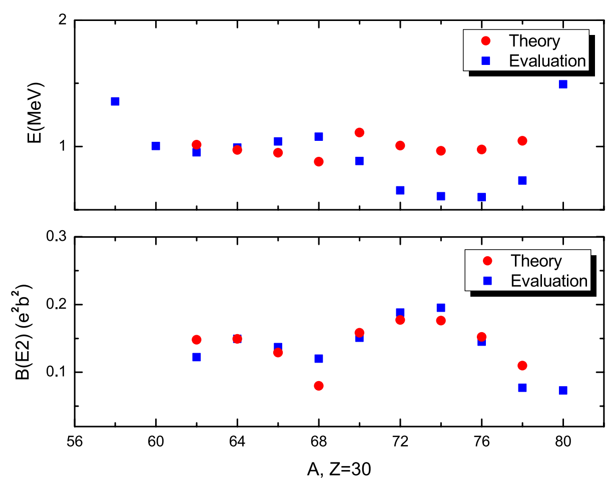
Graph 12. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Cr nuclei.



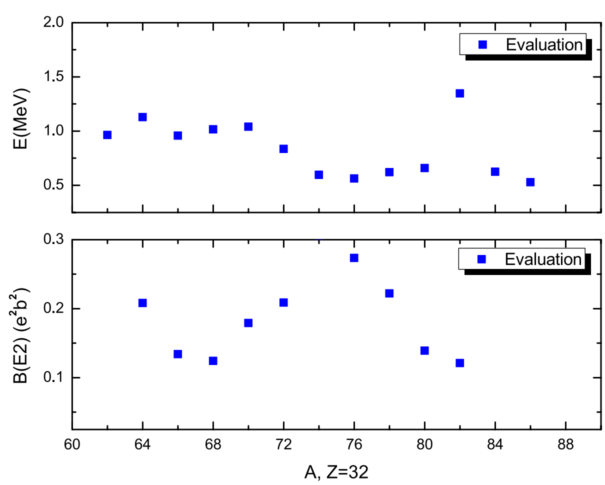
Graph 13. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Fe nuclei.



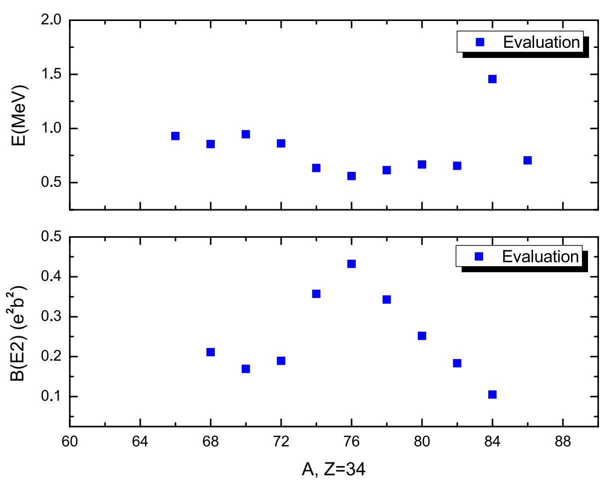
Graph 14. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ni nuclei.



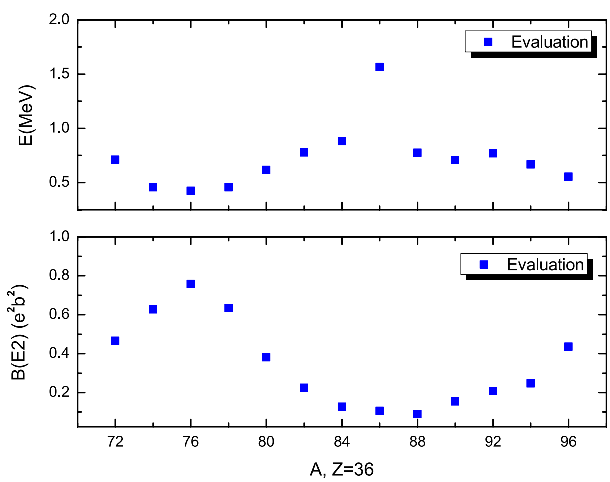
Graph 15. Evaluated and shell model calculated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Zn nuclei.



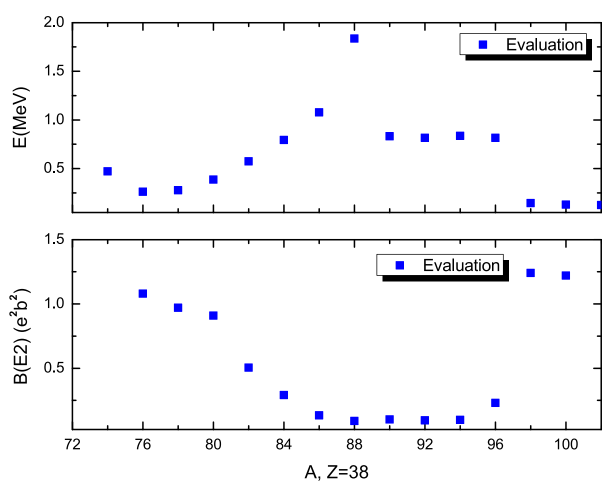
Graph 16. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ge nuclei.



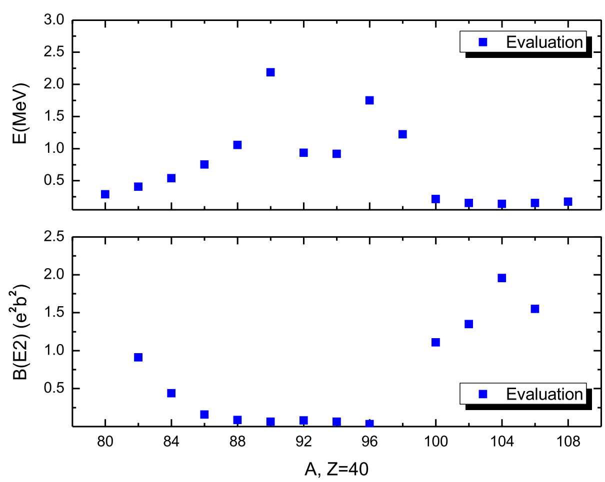
Graph 17. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Se nuclei.



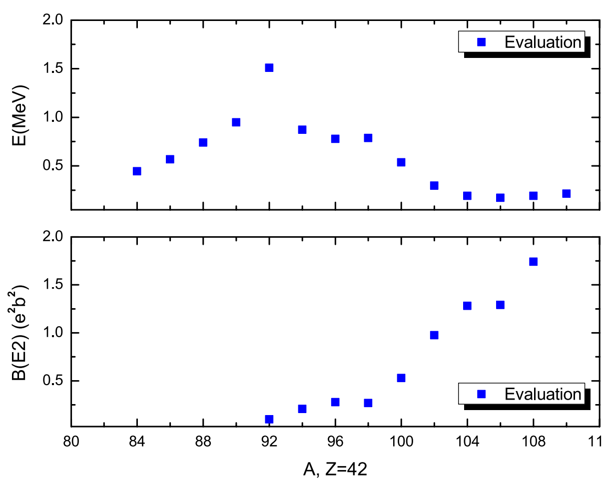
Graph 18. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Kr nuclei.



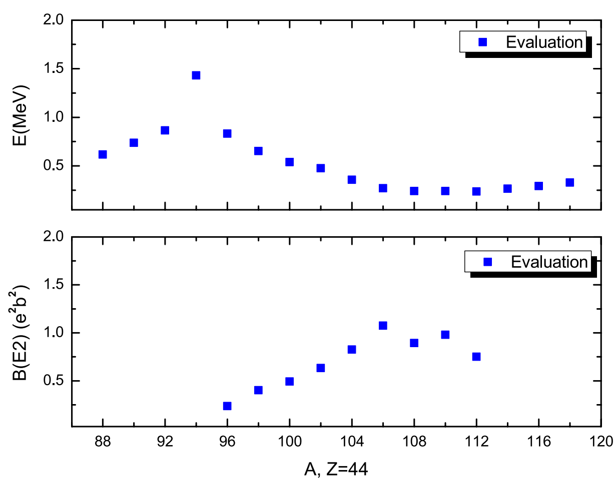
Graph 19. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Sr nuclei.



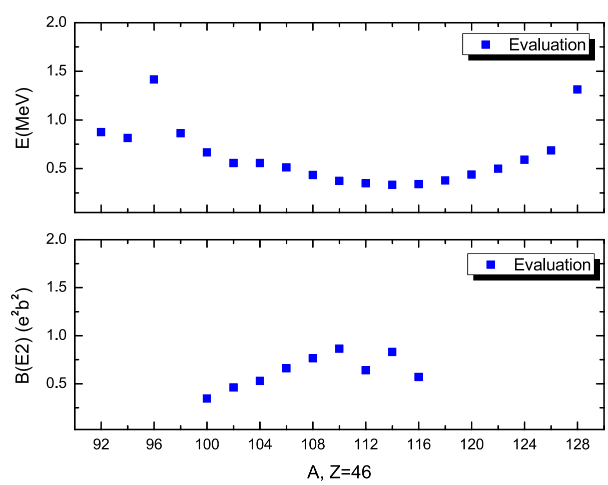
Graph 20. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Zr nuclei.



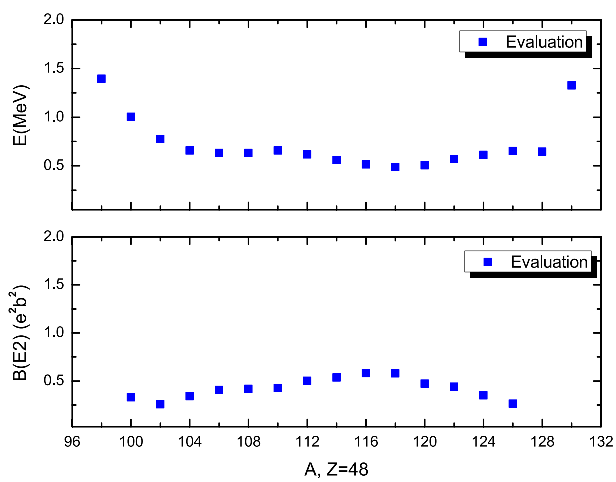
Graph 21. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Mo nuclei.



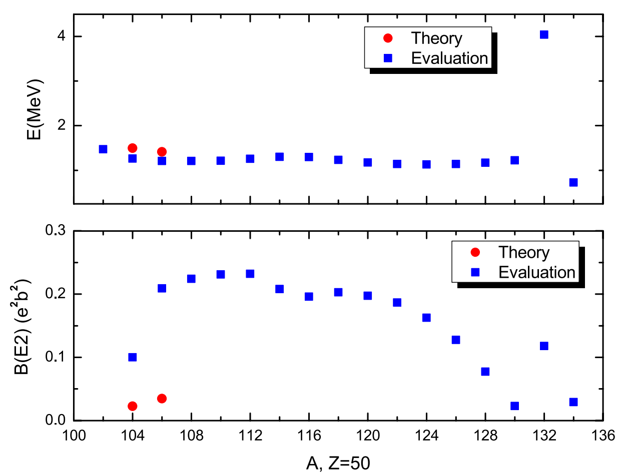
Graph 22. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Ru nuclei.



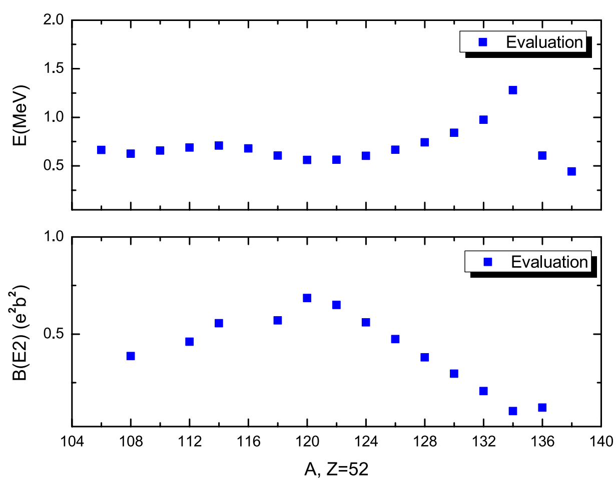
Graph 23. Evaluated energies, $E(2_1^+)$, and $B(E; 0_1^+ \rightarrow 2_1^+)$ values for Pd nuclei.



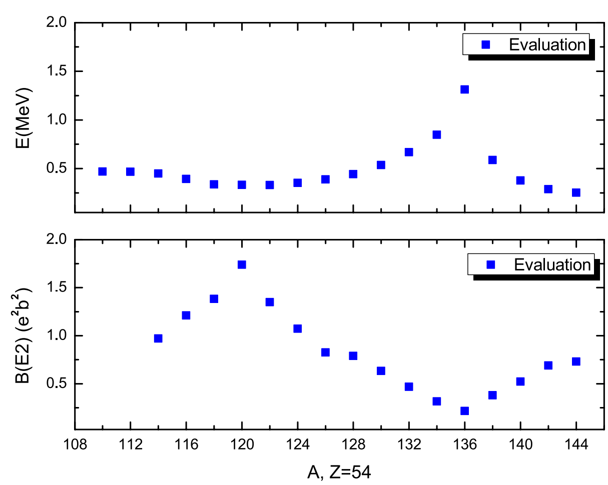
Graph 24. Evaluated energies, $E(2_1^+)$, and $B(E;\,0_1^+ \rightarrow 2_1^+)$ values for Cd nuclei.



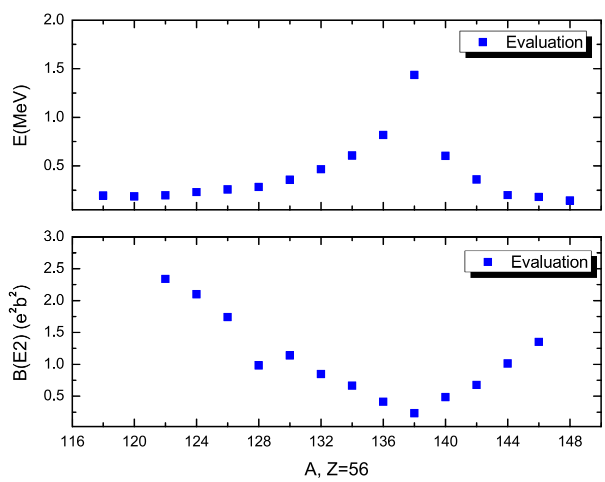
Graph 25. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Sn nuclei.



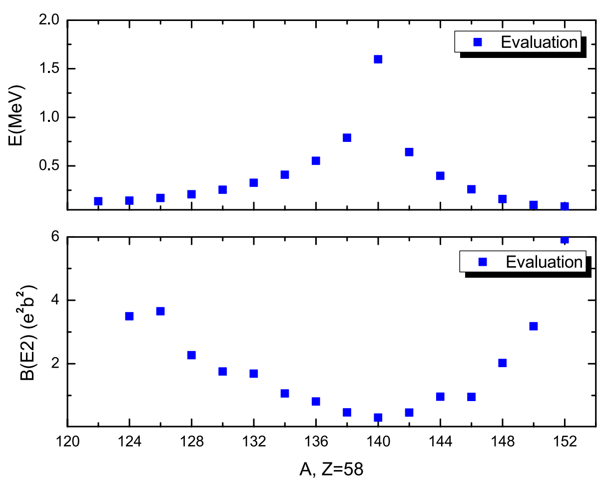
Graph 26. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Te nuclei.



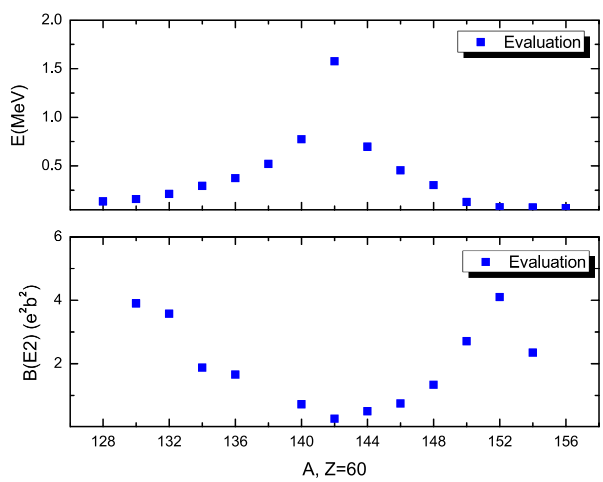
Graph 27. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Xe nuclei.



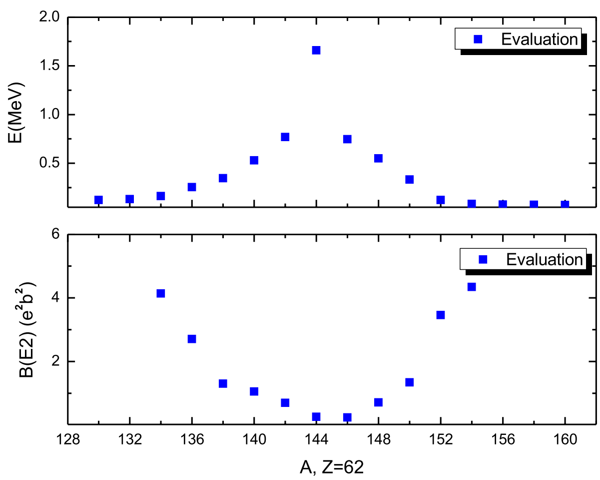
Graph 28. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ba nuclei.



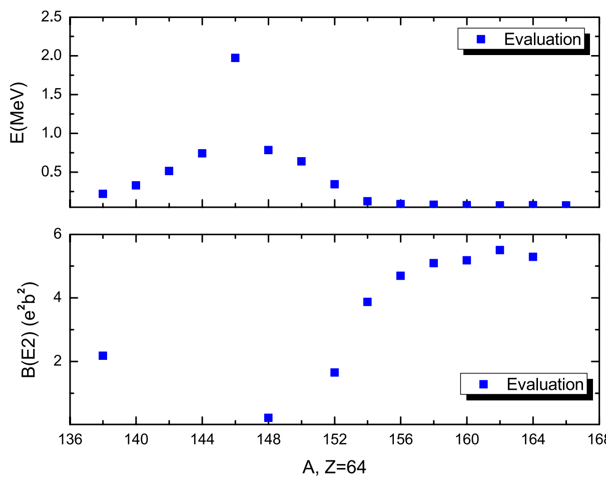
Graph 29. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ce nuclei.



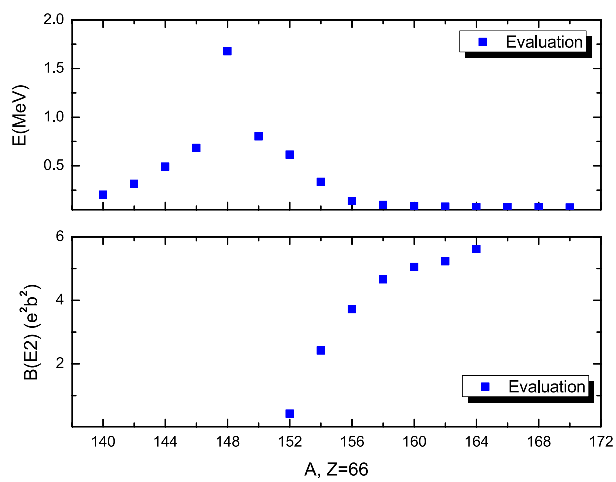
Graph 30. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Nd nuclei.



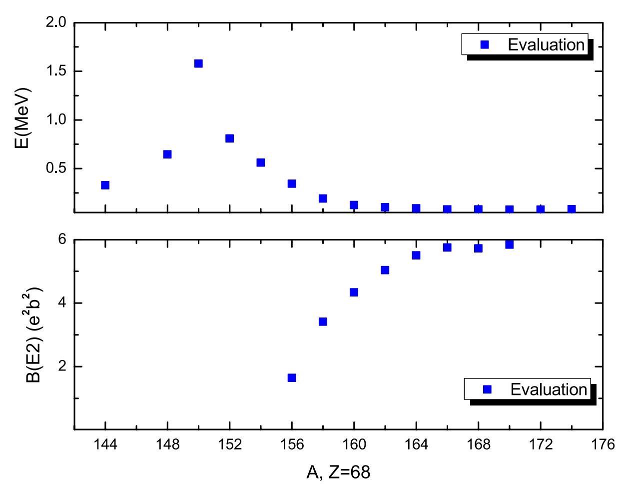
Graph 31. Evaluated energies, E(2^+_1), and B(E; $0^+_1 \to 2^+_1$) values for Sm nuclei.



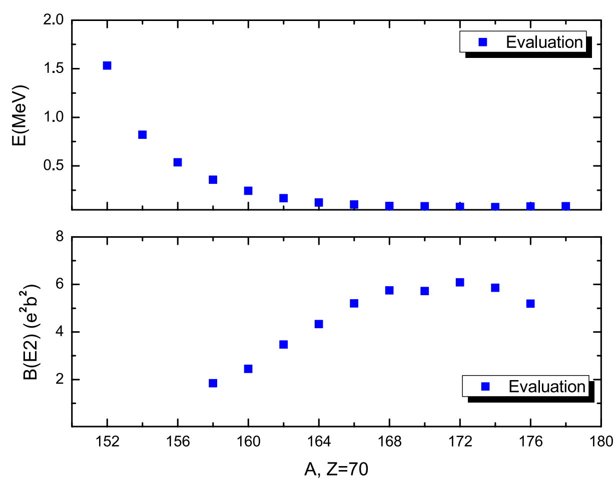
Graph 32. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Gd nuclei.



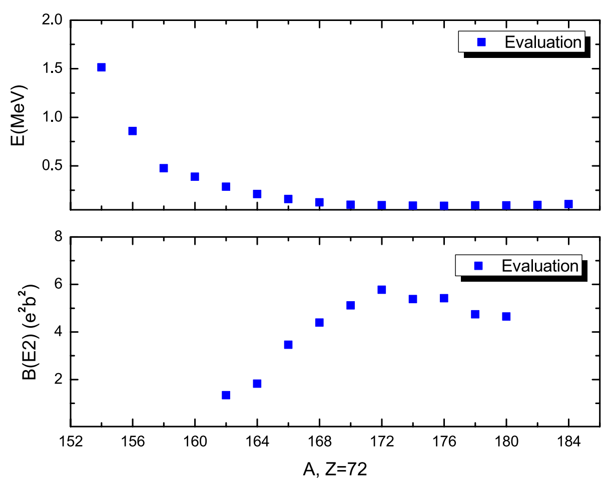
Graph 33. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Dy nuclei.



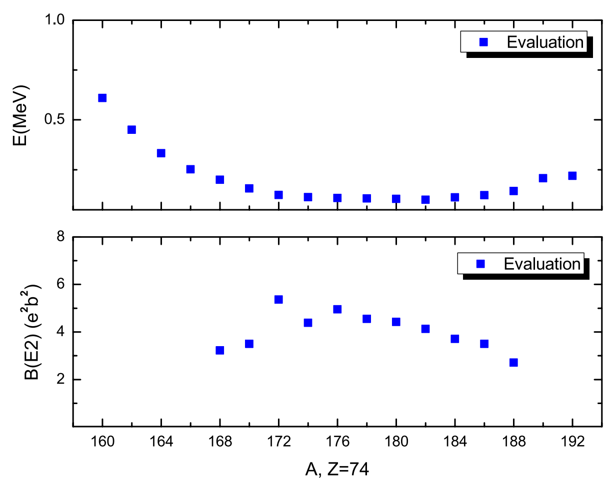
Graph 34. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Er nuclei.



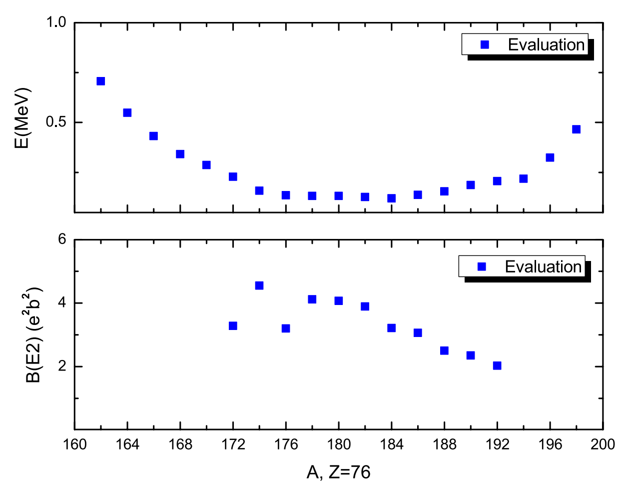
Graph 35. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Yb nuclei.



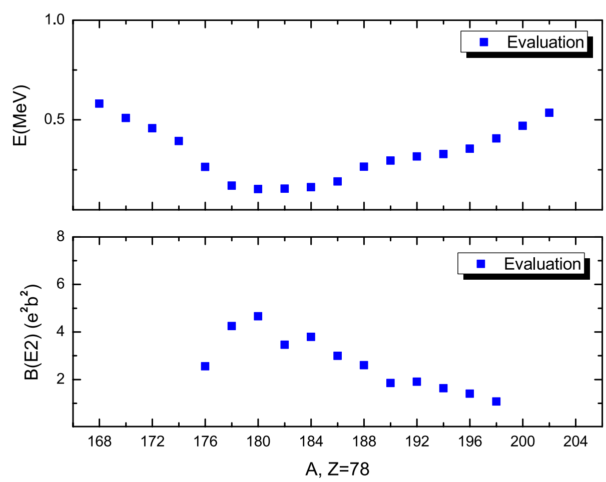
Graph 36. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Hf nuclei.



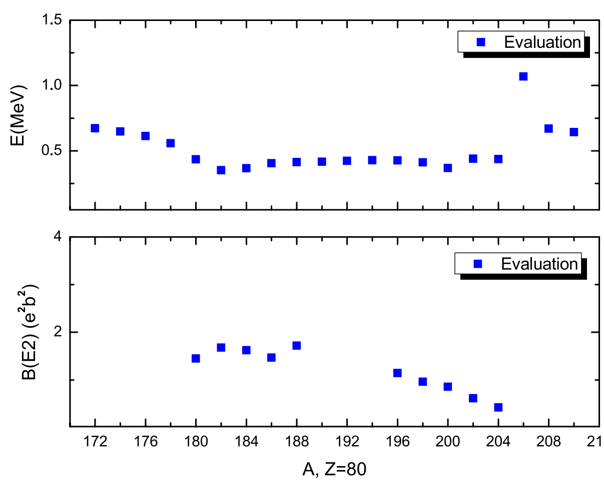
Graph 37. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for W nuclei.



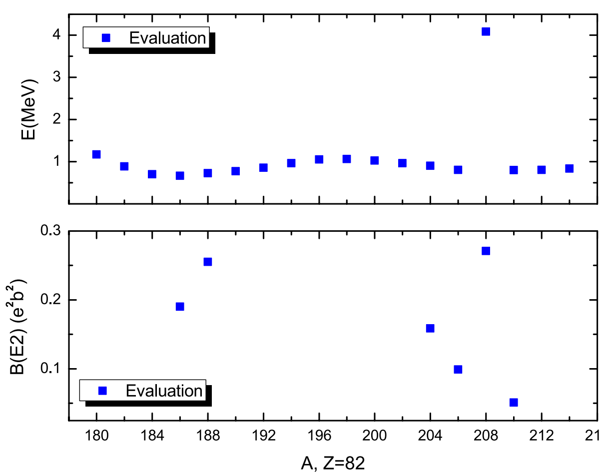
Graph 38. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Os nuclei.



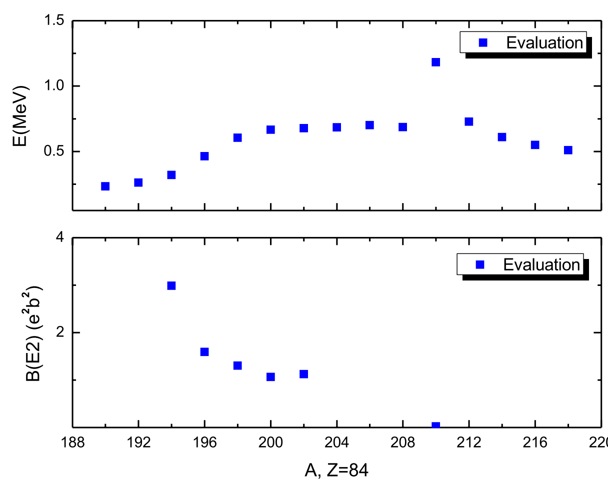
Graph 39. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Pt nuclei.



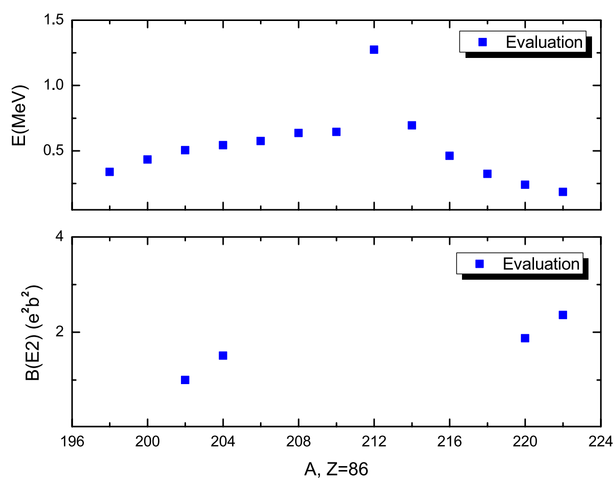
Graph 40. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Hg nuclei.



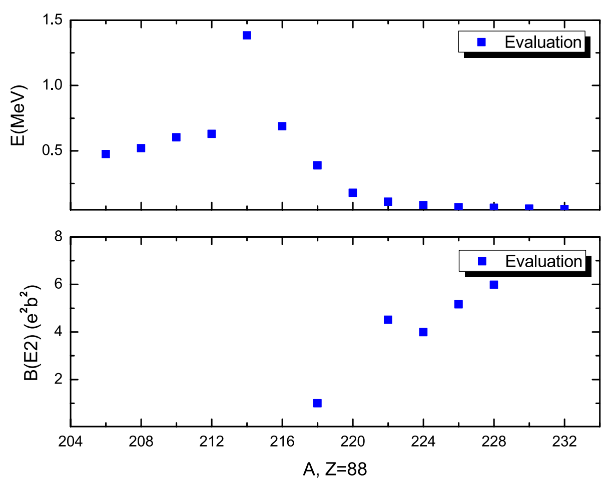
Graph 41. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Pb nuclei.



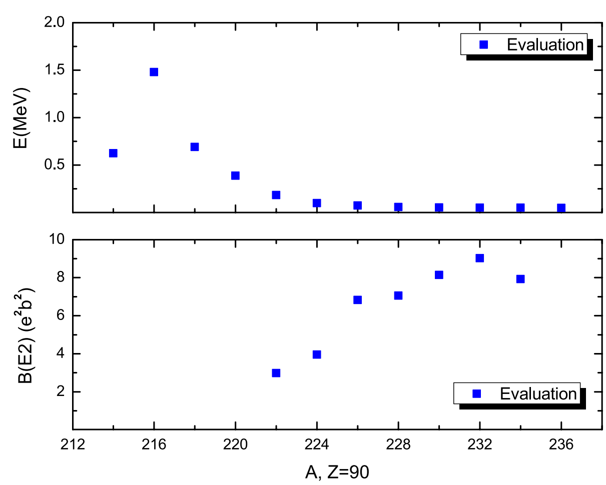
Graph 42. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Po nuclei.



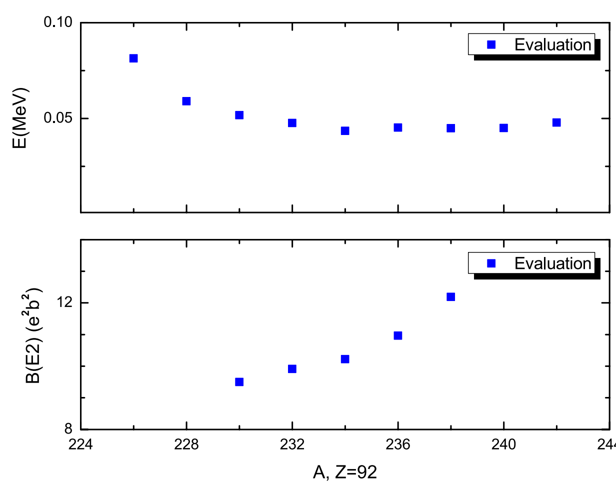
Graph 43. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Rn nuclei.



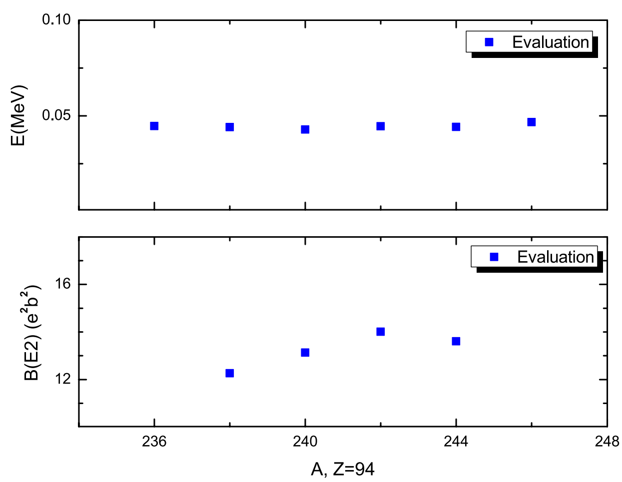
Graph 44. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Ra nuclei.



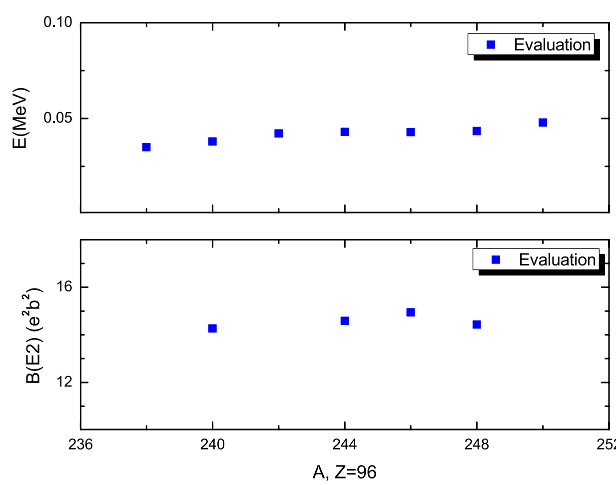
Graph 45. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Th nuclei.



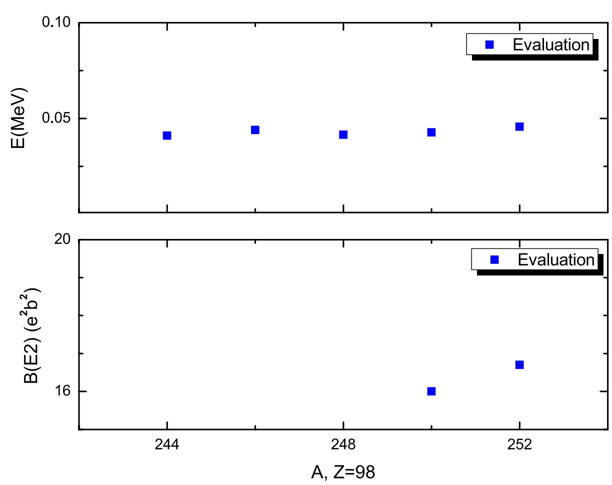
Graph 46. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for U nuclei.



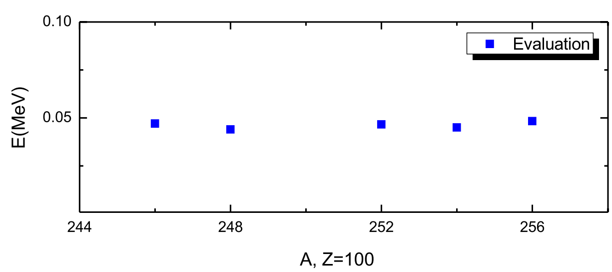
Graph 47. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \to 2_1^+$) values for Pu nuclei.



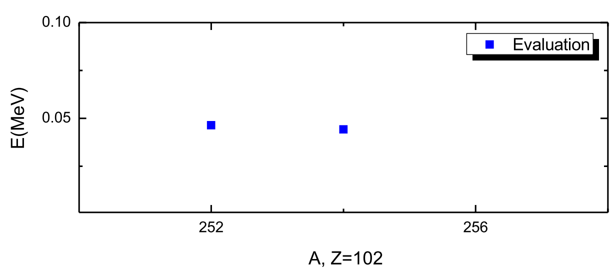
Graph 48. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Cm nuclei.



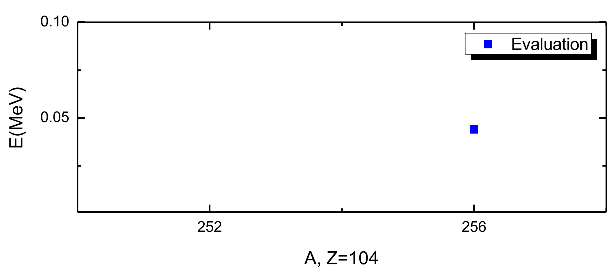
Graph 49. Evaluated energies, E(2_1^+), and B(E; $0_1^+ \rightarrow 2_1^+$) values for Cf nuclei.



Graph 50. Evaluated energies, E(2^+_1) for Fm nuclei.



Graph 51. Evaluated energies, E(2_1^+) for No nuclei.



Graph 52. Evaluated energies, E(2_1^+) for Rf nuclei.