

New web interface for evaluated $B(E2; 0^+ \rightarrow 2^+)$ data

B. Pritychenko

*National Nuclear Data Center, Brookhaven National Laboratory,
Upton, U.S.A.
pritychenko@bnl.gov*

Project Motivation

- B(E2) Data Evaluation & Compilation Continuity
- Web Access
- Integration with Nuclear Science References (NSR)
- Utilization of my expertise in this subject

Starting Point

Database content is originally based on work of S. Raman, C.W. Nestor and P. Tikkanen “Transition Probability from the Ground to the First-Excited 2+ State of Even-Even Nuclides”, Atomic Data and Nuclear Data Tables, **78**, Number 1, May 2001, 1.

B(E2) Database Schema

Adopted

nucleus	varchar(128)
charge	int
.....
be2	varchar(256)
comment 1	varchar(256)

Experimental

nucleus	varchar(128)
charge	int
.....
be2	varchar(256)
comment3	varchar(256)

Authors

reference	varchar(128)
number	int
.....
journal	varchar(256)
comment2	varchar(256)

Predicted

nucleus	varchar(128)
charge	int
.....
be2	varchar(256)
comment4	varchar(256)

B(E2) Application Functionality



- Four major database functions: select, insert, update and delete
- Integration with Nuclear Science References

<http://www.nndc.bnl.gov/be2>



The screenshot displays the NNDC National Nuclear Data Center interface. On the left, there is a navigation menu with options like 'NNDC Site Index', 'B(E2; 0+ → 2+) Values', 'Adopted Values', 'Experimental Values', 'Predicted Values', and 'Help'. The main content area is titled 'NSR Query Results' and shows search parameters: 'Output year order : Ascending', 'Format : Normal', and 'NSR database version of October 21, 2005'. The search results indicate 'Keynumber: 1977Ca14' and 'Found 1 matches'. A link for 'Back to query form' is provided. The main entry is for '1977CA14', citing 'C.R. Acad. Sci., Ser. B 284, 65 (1977)' by Y. Cauchois, H. ben Abdelaziz, Y. Heno, R. Kherouf, and C. Schloesing-Moller. The abstract describes the determination of average nuclear levels by resonance fluorescence with bremsstrahlung radiation. The nuclear reactions listed are $^{24}\text{Mg}, ^{27}\text{Al}, ^{48}\text{Ti}, ^{59}\text{Co}, ^{61}\text{Ni}, ^{62}\text{Ni}, ^{63,65}\text{Cu}, ^{64,66,68}\text{Zn}, ^{103}\text{Rh}, ^{113,115}\text{In}, ^{116,118,120}\text{Sn}(\gamma, \gamma)$, with measured resonance fluorescence and deduced $T_{1/2}$ levels.

Next Step

- 2006 Start B(E2) experimental data compilation
- Expand scope of compilation to all nuclei, not just even-even
- Include B(E λ) from T. Kibedi
- 2008 Produce B(E2) evaluation for 0⁺->2⁺ transitions in even-even nuclei

Future Nuclear Structure Help

- Create a simple $\beta\beta$ -decay Web application that will help ENSDF evaluators
- Explain the difference between $\beta\beta(0\nu)$ and $\beta\beta(2\nu)$ decay modes
- Set priority for $\beta\beta(2\nu)$ decay mode evaluation
- List best experimental results and limits
- Clarify difficult cases: ^{76}Ge $\beta\beta(0\nu)$ results
- Integrate experimental papers with NSR