

Argonne Nuclear Data Program



Member of the US Nuclear Data Program

supported by the Office of NP, U.S. DOE/SC

Nuclear Data *Compilations & Evaluations*

- ✓ nuclear structure and decay data compilations & evaluations for the International NSDD network ([ENSDF](#) & [XUNDL](#))
- ✓ **AME12 & NuBase12** – in collaboration with G. Audi & M. MacCormick, CSNSM (Orsay), W. Meng, IMP (Lanzhou) and B. Pfeifer, GSI (Darmstadt) – *presentation by W. Meng*
- ✓ DDEP coordinator – **completed**
- ✓ Horizontal nuclear data evaluation activities – IAEA CRP's, Isomers, Medical Isotopes

Complementary ND *Research Activities*

- ✓ CARIBU, FRIB and other RIB facilities, Gretina, IAEA-CRP – emphasis on nuclear structure physics and astrophysics, and their intersection with applied nuclear physics programs

Effort & Funding: *1.0* staff & *1-2* post-docs (non USNDP)

ANL Region of Responsibility

- 21 mass chains permanently assigned to ANL – the goal is to keep them up to date – expansion is unlikely given the current staff level

Mass Chain	NDS publication	Evaluator	Current Status
176	NDS 107 (2006) 791	M.S. Basunia	completed/LBNL
177	NDS 98 (2003) 801	F.G. Kondev	completed/under revision
178	NDS 110 (2009) 1473	E. Browne	completed/Argentina
179	NDS 110 (2009) 265	C.M. Baglin	completed/LBNL
199	NDS 108 (2007) 79	B. Singh	completed/McMaster
200	NDS 108 (2007) 1471	F.G. Kondev & S. Lalkovski	completed
201	NDS 108 (2007) 365	F.G. Kondev	completed
202	NDS 109 (2008) 699	S. Zhu & F.G. Kondev	completed
203	NDS 105 (2005) 1	F.G. Kondev	completed
204	NDS 111 (2010) 141	C.J. Chiara & F.G. Kondev	completed
205	NDS 101 (2004) 521	F.G. Kondev	completed
206	NDS 109 (2008) 1527	F.G. Kondev	completed
207	NDS 112 (2011) 707	F.G. Kondev & S. Lalkovski	completed
208	NDS 108 (2007) 1583	M. Martin	completed/ORNL
209	NDS 63 (1991) 723	M. Martin	being evaluated/J. Chen

- Very good post-docs – [C. Chiara & S. Zhu](#) – inability to keep them in the program & [J. Chen](#) (present) ????



ANL Region of Responsibility – cont.

- new region of responsibility – closely related to our research interest at ANL

Mass Chain	NDS publication	Evaluator	Current Status
106	NDS 109 (2008) 943	D. De Frenne & A. Negret	completed
107	NDS 109 (2008) 1383	J. Blachot	completed
108	updated online 2008	J. Blachot	completed
109	NDS 107 (2006) 355	J. Blachot	completed
110	NDS 113 (2012) 1315	G. Gurdal & F.G. Kondev	completed
111	NDS 110 (2009) 1239	J. Blachot	completed
112	NDS 79 (1996) 639	D. De Frenne & E. Jacobs	being evaluated/**

** In collaboration with Prof. S. Lalkovski, Univ. Sofia

- **A=133** was published in collaboration with St. Petersburg group & work is continuing on **A=188** (with S. Juutinen, Jyvaskyla and D. Hartley, USNA) and **A=174** (with T. Kibedi, ANU and H. Xiaolong, CNDC) – it is a time consuming effort, is it worth it?

XUNDL Compilations

- ❑ **Contributing since 2009 – in collaboration with B. Singh (McMaster Univ.) & J. Kelley (TUNL)**
 - ✓ covering *Phys. Lett. B, J. Phys. G, Nucl. Phys. A & Nucl. Instrum. & Methods A & B* – numerous interactions with the authors - *presentation by B. Singh*
 - ✓ ANL follows the very successful McMaster model – established contacts with local Universities – **DePaul Univ. (Prof. S. Fisher)** – undergraduate students involvement in compilation activities: W. Murray (currently PhD in NE at Georgia Tech) and J. Modica; possibility to involve graduate students from **Univ. of Chicago (Prof. G. Savard)**
 - ✓ collaboration with **Prof. D. Hartley (USNA)** – faculty (tenured) member – visited ANL for a week (together with B. Singh) and trained - spent two months on sabbatical at ANL in the summer of FY11 (**one month leveraged by USNA funding**)

- ❑ **The future of this activity at ANL** - will depend on the ability to bring a new staff member and/or a post-doc

Nuclear Data Research Activities

Complement the evaluation activities at ANL Nuclear Structure physics and Astrophysics and their intersection with the applied Nuclear Physics

- ❑ at **ANL** - using Gammasphere & FMA – nuclei far from stability, spectroscopy of heavy and super-heavy nuclei, K-isomers, beta-delayed spectroscopy, surrogate reactions ... decay spectroscopy of actinide nuclei and nuclei of importance to applications of medical isotopes and metrology
 - ✓ at ATLAS & CARIBU – we have 3 approved proposals – two priority I and one priority II
 - ✓ possibility to establish a new program at APS – Auger emissions spectroscopy - collaboration with ANU (T. Kibedi) and U. Surrey (A. Nichols)
- ❑ at **MSU** (Coulex & decay spectroscopy), **TRIUMF** (decay spectroscopy) & **RIKEN** (in-beam spectroscopy) – properties of neutron-rich nuclei far from the line of stability
- ❑ at **Australian National University** (isomers, astrophysics & medical isotopes physics) and **Jyvaskyla University** (spectroscopy of SHE)
- ❑ at **IAEA** – new CRP on “Nuclear Data for Charged-particle Monitor Reactions & Medical Isotopes Production” - both data evaluation and measurements

Statistics

2011-2012

- ❑ **37** journal publications
- ❑ **5** refereed publications & **28** published abstracts in conference proceedings & workshops
- ❑ **11** invited presentations at international conferences & workshops; **10+** contributed talks
- ❑ **4** invited seminars & colloquiums

Active Collaborations

ANU, IIT Roorkee, U. Sofia, U. Surrey, McMaster U., TUNL/NC State, NNDC, IAEA, CSNSM & INP-Orsay, IMP-Lanzhou, ANL, LBNL, ORNL & UT, INL, MSU, FSU, USNA, UML, U. of Notre Dame, MState U., U. Maryland, RIKEN, Jyvaskyla U., IPJ Krakow, U. Manchester