XUNDL status report: FY-13

(Includes papers on Mass measurements)

Balraj Singh: Coordinator for XUNDL project
(McMaster University)

US-NDP November 18-20, 2013

Contributors

- McMaster: Balraj Singh
  Ervin Thiagalingam (*) (up to April 2014)
  Elaine McNeice (*) (since Jan 2013, up to Dec 2013)
- TUNL (A=2-20): John Kelley, Grace Sheu, Jim Purcell
- ANL: Filip Kondev, Jun Chen
  Joshua Modica (*) (up to Feb 2013)
  NP-A, PL-B, JP-G journals
- NNDC, BNL: Jagdish Tuli: XUNDL database management

TOTAL (US-NDP) EVALUATOR EFFORT: 0.50 FTE (most of it gets back to ENSDF)

- Other contributors: Dmytro Symochko (IKP, TU, Darmstadt)
  Anagha Chakraborty (Krishnath College, India)
  Stefan Lalkovski (Sofia, Bulgaria)
- (*) Undergraduate student

Current Contents of XUNDL

- Since the start in December 1998, 5390 compiled datasets up to Nov 8, 2013.

  In addition, many datasets updated for new papers from the same group/lab or data details received from the authors

  (experimental nuclear structure data: reactions and decays)

- 2202 nuclides: ^{1}H to ^{294}118, spread over 280 A-chains;

- From ~3350 primary journal articles published during 1995 – 2013. Additional ~105 papers on mass measurements compiled separately

- ~700 communications with the original authors to resolve data-related problems and to obtain additional data details.

- All communications between 1999 and Feb 2013 were put together in MS-Access database, file sent to NNDC and ANL.

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Number of papers by year

(Data provided by J. Tuli)

Year of Pub.	No. of Papers	Year of Pub.	No. of Papers
1995	57	2005	202
1996	68	2006	177
1997	66	2007	218
1998	126	2008	246
1999	121	2009	305
2000	140	2010	299
2001	131	2011	311
2002	139	2012	295
2003	137	2013	142
2004	172		

Work during Oct 3, 2012 to Nov 8, 2013

- 446 datasets compiled from about 240 publications

  McMaster: 353 (+ checking/editing of 93 datasets from TUNL+ANL)

  TUNL: 65

  ANL: 28

- 18 existing datasets were updated at McMaster based on either new papers from previous authors/groups or for additional information received from the authors.

Many papers are compiled and entered in XUNDL database prior to their entry in NSR database. Temporary key-numbers are replaced by permanent ones every six months or so through a code written by Michael Birch.

As of Nov 8, 2013, about 30 current papers are being compiled.

Active communications with the authors continued throughout the year. Data details and corrections received for several papers. Timely communication with the original authors helps both the data evaluators and researchers.

Compilation of Atomic mass measurements

15 mass measurement papers published during Nov 2012 to Nov 2013 were compiled and data file posted on www.nuclearmasses.org at ORNL by M. Smith.

This file contains 130 data points, including pairs of mass differences and Q values for beta or double-beta decays. Measured masses are compared to AME-2012.

This work is by B. Singh and E. Thiagalingam

XUNDL Working Group Meeting

TUNL, Duke University, May 16-17, 2013

Hosted by John Kelley

Details available at

https://www-nds.iaea.org/nsdd/xundl_tunl_meeting.pdf

Participants

- John Kelley (TUNL)
- Grace Sheu (TUNL)
- Aaron Hurst (LBNL)
- Christian Iliadis (TUNL,UNC) (*)
- Filip Kondev (ANL)
- Caroline Nesaraja (ORNL: online participation)
- Balraj Singh (McMaster Univ.) (*)
- Alejandro Sonzongi (NNDC, BNL)
- Jagdish Tuli (NNDC, BNL)

(*) : Presentation

Topics for Discussion

- Meeting objectives
- Conversation on role of XUNDL
- Organizational framework
- Journal coverage
- Compilation policies
- Dissemination
- Software development
- Future activities
- Future contributing centers

Journals covered: ENSDF-relevant articles

Regular scanning (independent of NSR work) Jan 1-Nov 15, 2013 data below

Physical Review Letters: 40 (14% of total 290)

Physical Review C: 196 (68% of total)

Physics Letters B: 17 (6% of total)

Nuclear Physics A: 10 (+4 on HYP-NUC)

European Physical Journal-A: 9 (+1 on ββ decay)

Journal of Physics-G: 4 (+1 on ββ decay)

PRIMARY NUCLEAR STRUCTURE JOURNALS

Nuclear Instruments & Methods A&B: 0

Applied Radiation and isotopes: 7 ($T_{1/2}$ and Iγ)

Chinese Physics Letters: 3

Chinese Physics C: 1

Acta Physica Polonica B: 12 ? (conference articles: likely to appear elsewhere)

International Journal of Modern Physics-E: 0

Physics of Atomic Nuclei: 2

Bulletin Russian Academy of Sciences-Physics: 0

ArXiv Preprints: 10 ? (likely to appear in journals)

May be missing <5% (from other journals)

Future Plan of XUNDL work

- TUNL: A=2-20 region
- ANL: 1 paper/week; number could go up to 2-3/week if Jun Chen's position is regular. Software development for input of large data tables in papers
- ORNL: 1-2 papers/week
- LBNL: considering participation.
- McMaster: coordination + compilation
- For A>21 region, papers to ANL and ORNL to be suggested by B. Singh.
- Other groups welcome.

Aim and Role of XUNDL

- Provides prompt and convenient web access to current publications in experimental nuclear-structure data through on-line retrieval systems at BNL, ORNL and LBNL. Aim is the same as defined in 1998 after deliberations with several researchers at different labs in the U.S.

- Complements ENSDF database since data for many nuclides in ENSDF are quite outdated (i.e. more than 10 years old).

- Corrections in existing datasets in ENSDF database based on compilations. Prompt inclusion of data in ENSDF for newly discovered nuclides and for those nuclides for which excited-state data have become available

- Frequent communications with authors of papers to resolve inconsistencies in data, and to obtain additional details of data. Some authors send submissions to XUNDL database for repository of data, which do not appear in their papers, but are referred to XUNDL. Ultimately it enhances ENSDF.

Compilation Policies

- Critical in-depth compilation of a paper, but not evaluation i.e. no comparisons made with previous papers on the same topic.
- For completeness, sometimes data taken from ENSDF.
- Requests to the original authors for additional data details, clarification of data inconsistencies, etc.
- Semi-automatic procedures whenever possible.
- Compiled datasets run through network codes as needed, such as FMTCHK, GTOL, BrIcc, LOGFT, RULER, PANDORA, ENSDAT.
- Manual checking with data in the original papers.

Some summary comments

- General consensus was to continue the XUNDL activity in foreseeable future.
- Articles should be compiled within a month or so of availability on journal web-pages
- A clear need for some searchable function was suggested: e.g. γ-ray energy and coincidence searches. Some thought was given to a NuDat-type interface, but serious complications were acknowledged. Alejandro suggested an action item on NNDC to look into the possibility of developing a code for retrieval of data of interest from XUNDL database. It would be also useful to consult with the development made at IAEA-NDS.