XUNDL Status Report:
(Oct. 1, 2003 – Sept. 30, 2004)

B. Singh (McMaster)
D.F. Winchell (BNL) and T.W. Burrows (BNL)
October 25, 2004
(USNDP-2004 meeting: Nov. 3-5, 2004)

Overview

- To make currently published experimental nuclear-structure data available in convenient electronic format

- ENSDF-style datasets compiled from one paper, or a set of related papers from the same experimental group.

- Covering both high- and low-spin papers. Current literature on experimental nuclear structure still dominated by high-spin publications (~60%), as judged by regular viewing of web pages of primary nuclear physics journals (PRL, PL-B, PR-C, NP-A, EPJ-A, JP-G)

Overview *cont.*

- Compilation work done primarily at McMaster (~93% contribution).

- Database management handled at NNDC, BNL

- Requires a consistent level of effort in keeping up-to-date with published literature, communication with original authors and participation of students

Current Contents of XUNDL

- Since the start in January 1999,
  1326 datasets added up to Oct. 1, 2004

- Covers mainly high-spin structures; but since 2003, most low-spin papers have also been compiled.

- 915 nuclides: ^{13}N to ^{288}115, spread over 221 A-chains

- Data from 1140 primary references published mainly during 1995 – 2004

Work in FY-04

- 226 datasets compiled since October 2003; which include data from 112 papers published in 2004 alone.

- 15 existing datasets revised/updated based on new papers from previous authors/groups

- Most current low-spin papers have also been compiled

- Undergraduate student, Joel Roediger, actively participated in XUNDL work in 2004

- Except for about 10 papers published in the last 3-4 weeks, we are current on the compilation of high- and low-spin publications

Undergraduate Student Participation

- Students trained in:
  - Basic nuclear physics and experimental techniques
  - Retrievals from ENSDF, XUNDL, NSR databases
  - ENSDF format and nuclear quantities involved
  - Use of semi-automatic translation codes
    (PDF to TEXT, TEXT to ENSDF)
  - Use of format and consistency checking codes
    (FMTCHK, PANDORA, ISOTOPE EXPLORER)
  - Use of calculation codes
    (GTOL, HSICC, LOGFT)

Compilation Methods

- Commercial code Finereader used extensively to create tabular text files from PDF files in journal web pages

- TABULAR-TEXT to ENSDF conversion code, developed at McMaster, routinely used to generate draft ENSDF-formatted datasets

- Datasets run through codes such as FMTCHK and GTOL

- HSICC and LOGFT codes used for decay datasets

- Level schemes, bands and numerical data in the compiled dataset run through the ISOTOPE-EXPLORER code. Finally all data transcription checked manually.

- Data-related discrepancies/inconsistencies and requests for additional data details are resolved with original authors via e-mail communication

Communication with authors

- Authors of original papers frequently contacted to resolve data-related errors/inconsistencies, and/or to request additional details of data

- Generally, prompt and useful response received from the authors

- Compilation of ~50 e-mail communications (Aug 2003-Aug 2004) containing additional information (data) and/or clarifications have been sent to BNL as a composite computer file and in print version

- Private communications have not been assigned NSR key numbers

- A-chain evaluators or other users can request copies and/or assignment of key numbers, if deemed necessary

Conclusion

- We believe that datasets in XUNDL are being used by ENSDF evaluators in their A-chain/nuclide evaluation work

- Availability of compiled XUNDL datasets should potentially accelerate data-evaluation process, and turn around time of A-chain updates in ENSDF database

- Amongst the two databases, ENSDF and XUNDL, we believe that the experimentally known/published high-spin level structures are now adequately covered and made conveniently available to research/user community through NNDC's internet retrieval system, LBNL's Isotope Explorer and ORNL's Radware software