XUNDL Status Report:
(October 1, 2006 – Sept 30, 2007)

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eXperimental Unevaluated Nuclear Data List

- Provides prompt and convenient web access to current publications in experimental nuclear-structure data (level-scheme information) through on-line retrieval systems at BNL; RADWARE at ORNL and Isotope-Explorer at LBNL.
- ENSDF-formatted datasets compiled from one paper, or a set of related papers from the same group.
- Covers recent experimental structure papers mainly in PR-C, PRL, EPJ-A, NP-A, PL-B, JP-G, IJMP-E, Chinese Physics Letters.
- Compiled datasets generally available in the database within ~2 weeks of publication.
- Compilation work done primarily at McMaster. Database management at NNDC by Dave Winchell (from December 1998 until May 2007); by Jagdish Tuli (since May 2007)

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- Undergraduate student participation: first drafts of compiled datasets are prepared by undergraduate students trained in basic nuclear physics, familiarity with ENSDF, XUNDL and NSR databases; and computer codes: PDF to TEXT to ENSDF; FMTCHK; PANDORA; ENSDAT; Isotope-Explorer; GTOL; BrIcc; LOGFT.

Each dataset is internally evaluated through consistency checks and communication with the authors about data-related problems and unpublished data. Significant additional data have been obtained and several errata have been published based on such timely communications. These compilations are thus somewhat more than simply data entry or coding of papers.

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Current Contents of XUNDL

- Since the start in December 1998,
  2380 datasets added up to September 30, 2007;
  over 330K lines of data.

- Covers mainly high-spin structures up to 2003,
  almost all experimental structure papers between 2004 - 2007.

- 1416 nuclides: ^{7}Li to ^{294}118, spread over ~255 A-chains;
  some datasets for hypernuclides also.

- Data from ~1750 journal references published during 1995 – 2007

- About 200 communications with the original authors to resolve data inconsistencies and to obtain additional data details.

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Work during October 1, 2006 to September 30, 2007

- 368 datasets compiled from about 200 publications.
- 25 existing datasets underwent major revisions based on new papers from previous authors/groups
- McMaster undergraduate students: Maxim Mitchell (March 2006 – April 2007) and Scott Geraedts (from March 2007 onwards) participated in XUNDL compilations.
- Scott Geraedts has undergone training in the XUNDL compilation procedures and basic knowledge of nuclear physics and spectroscopy, databases and ENSDF utility and analysis computer codes.
- As of November 2, 2007 we are current on the compilation of current papers. Scott is working on three papers published in the week of Oct 29.

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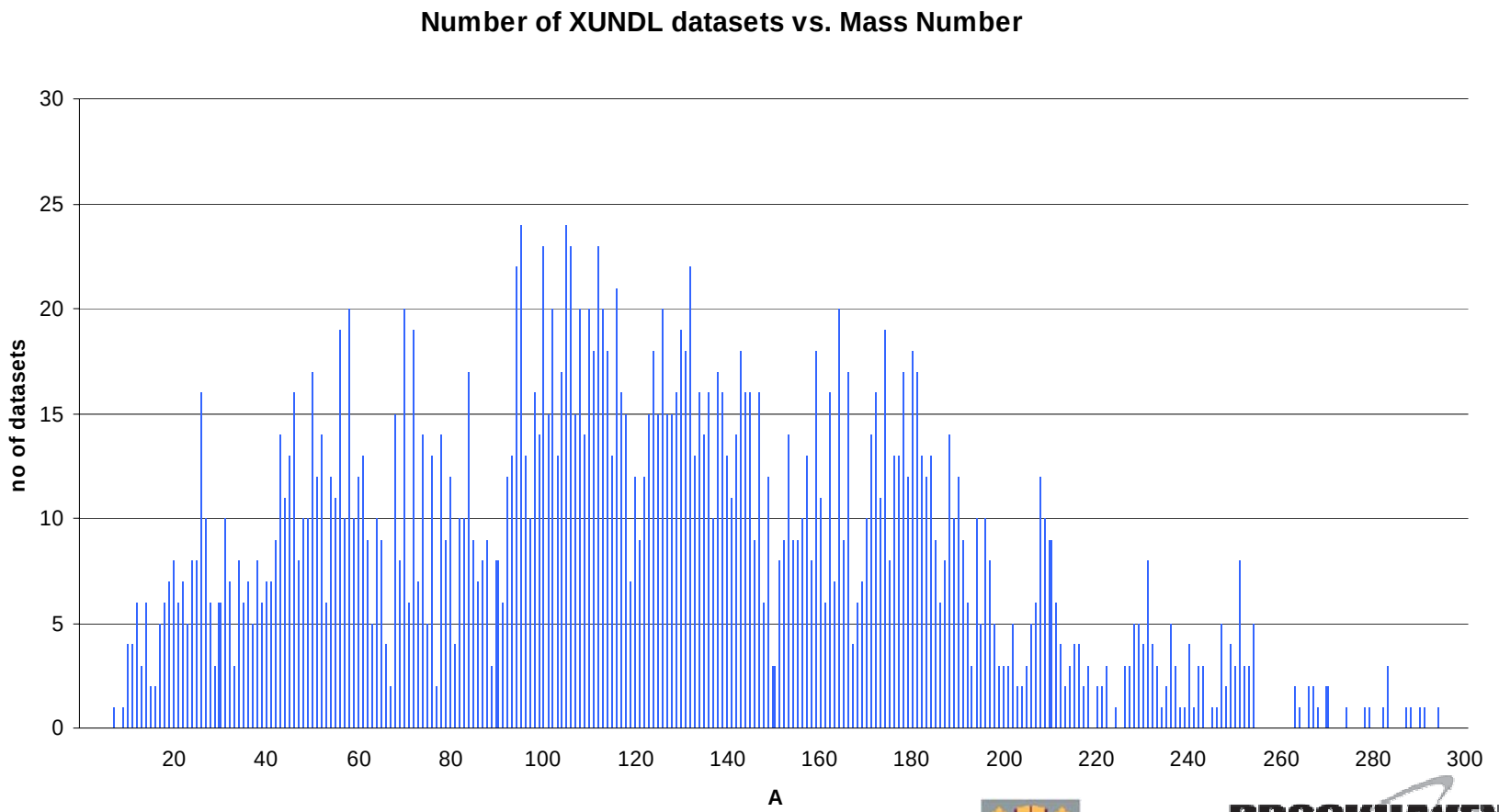
XUNDL content as of Oct. 1, 2007



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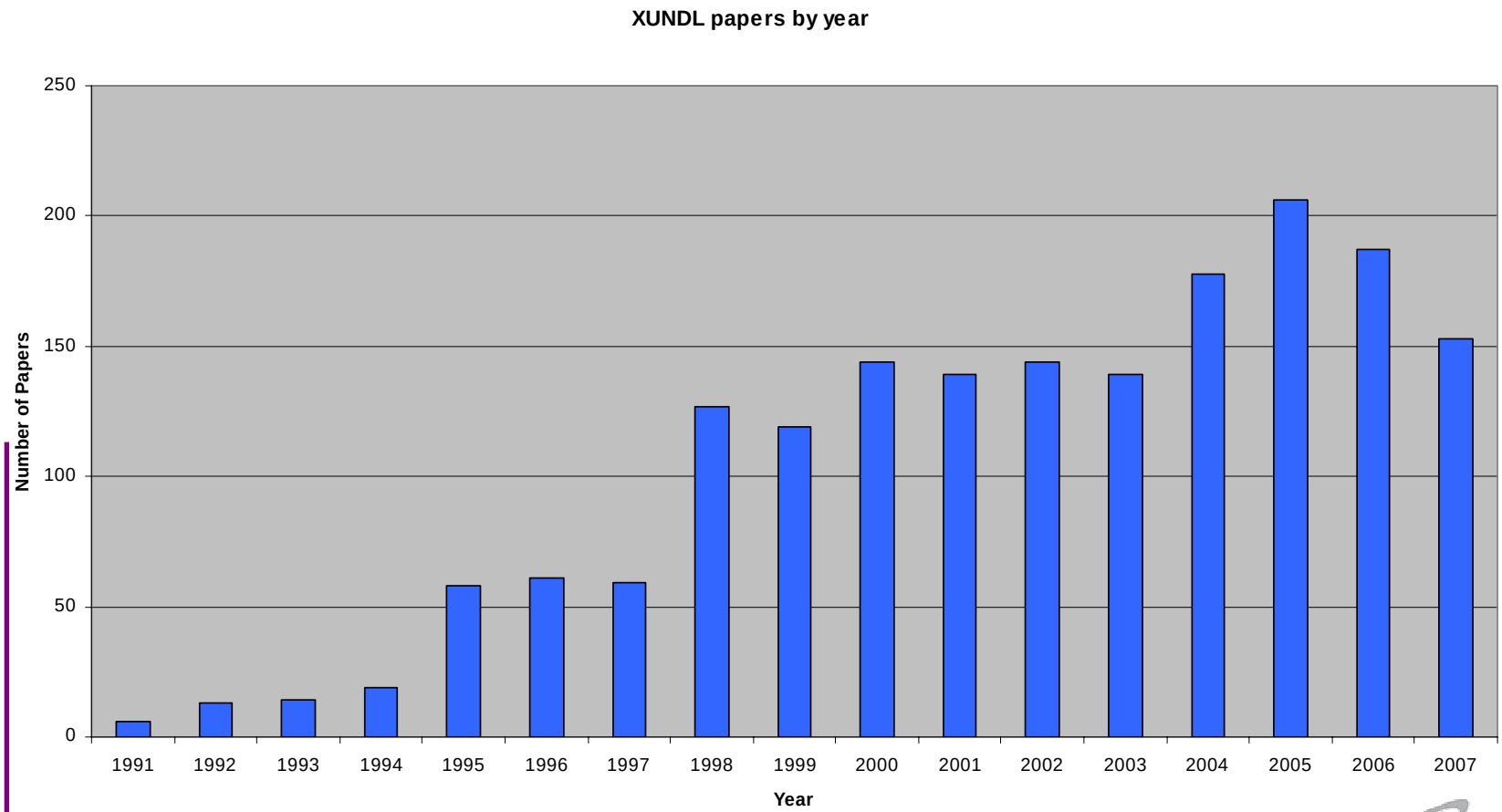
XUNDL content as of Oct 1, 2007



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Problem cases

Some examples where authors were contacted:

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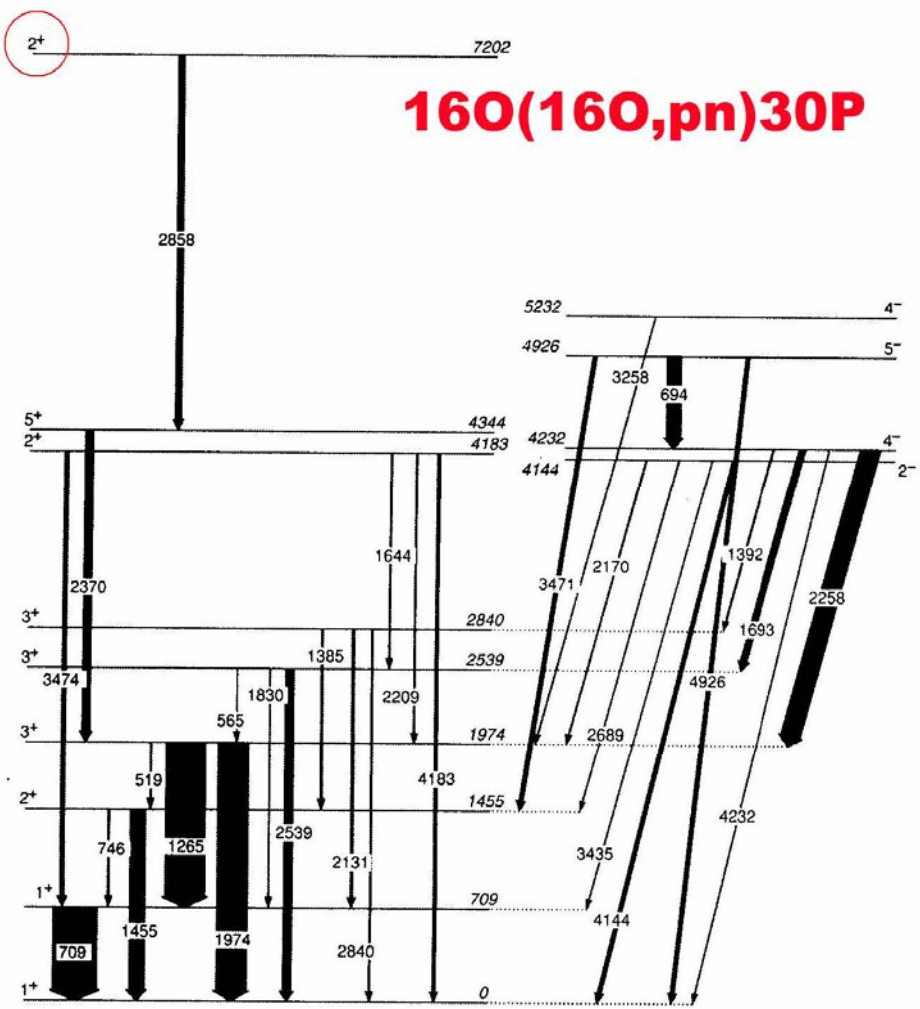

FIG. 2. Partial level scheme of ^{30}P populated in the present work.

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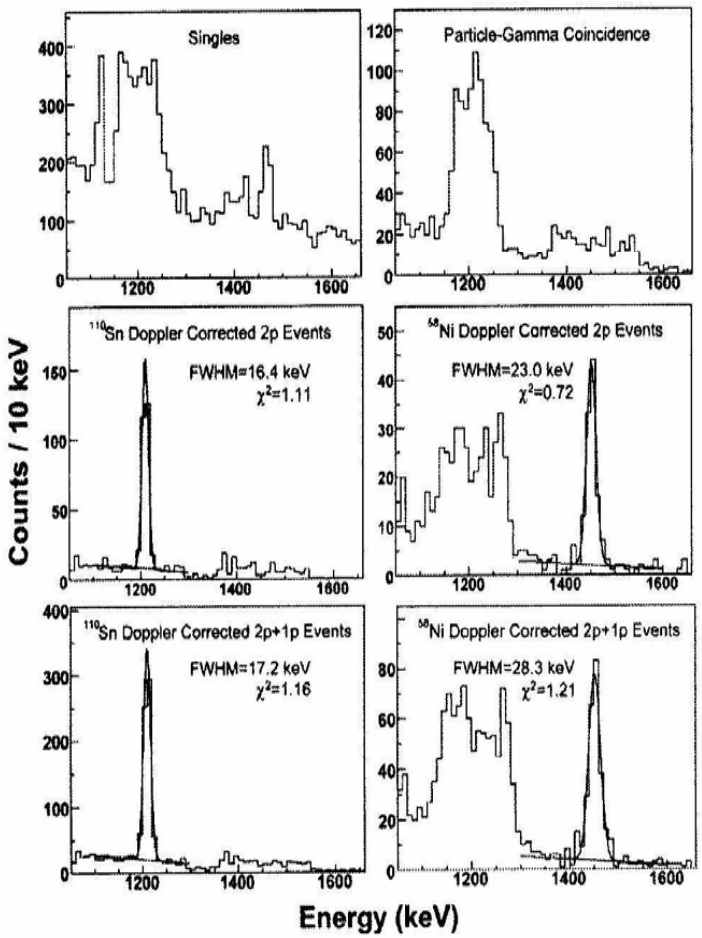

the DSSSD. The Doppler-corrected spectra for these events are shown in the central panel of Fig. 2. A subset of events contains only 1-particle + γ-coincidences ($1p + \gamma$). These correspond either to the range for scattered beam below 24° or to events where only one hit could be uniquely reconstructed from the DSSSD. This is, e.g., due to noise or double hits. Note that in a true $2p$ event the particles come back to back in the c.m. system and are thus detected in opposite quadrants in the DSSSD and cannot cause double hits. Furthermore, two-body kinematics can be completely reconstructed by detecting one of the particles. As seen in Fig. 2 reconstruction leads to a slightly larger half-width. The intensities obtained in this fashion were used to extract the $B(E2)$ for the first 2^+ state in ^{110}Sn. The method relies on the fact that the $B(E2)$ for the first 2^+ state in ^{58}Ni is known. The cross section for exciting target and beam particles is proportional to the corresponding $B(E2)$. The angular distribution of the cross section was calculated for the relevant angular ranges using the code CLX [13]. Taking into account the beam purity, a small angular correction and the γ-ray detection efficiency, the $B(E2)$ for the first 2^+ state in ^{110}Sn was determined to be $B(E2) = 0.220 \pm 0.022 e^2b^2$ (see Table I). The method and the

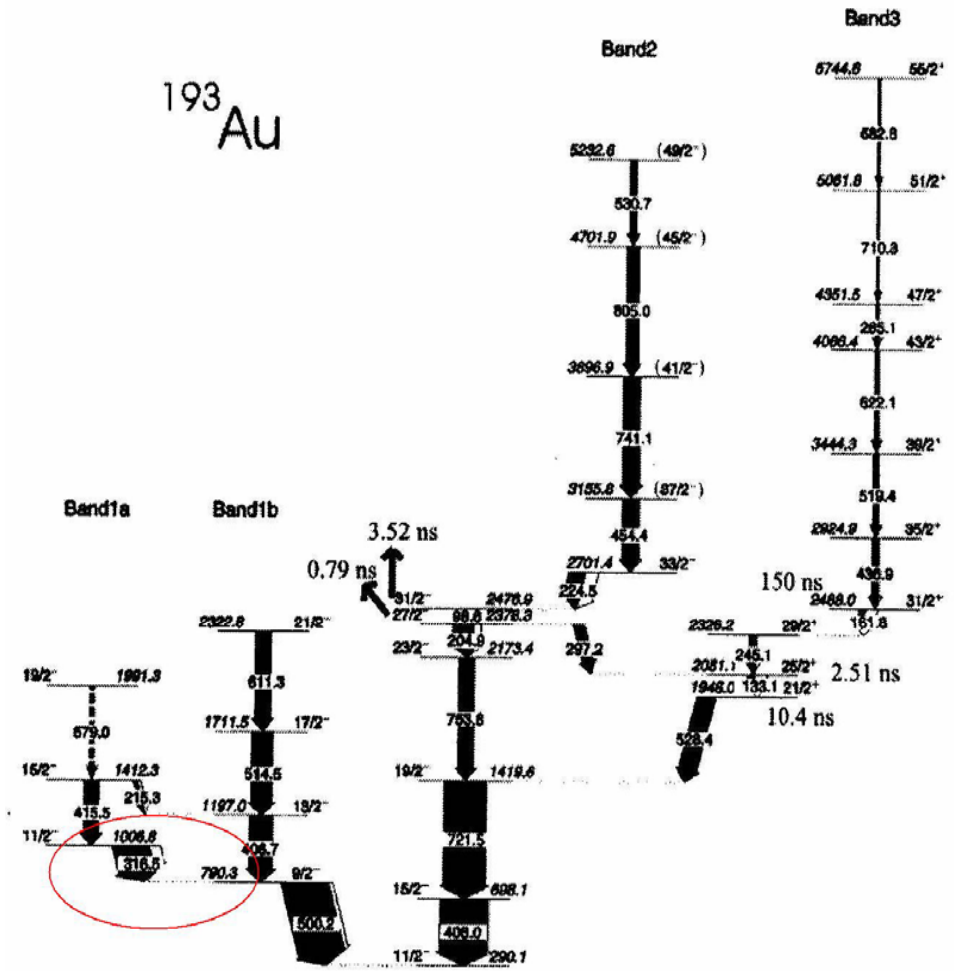

FIG. 1. Level scheme of ^{193}Au, as deduced from the ^{186}W(^{11}B, 4n) reaction at 68 MeV.

Conclusions

- Compiled datasets in XUNDL seem useful for ENSDF evaluation work and perhaps for research community also.

- Future of XUNDL Compilations?: If this activity is to continue on a long-term basis, it is perhaps time now that some other data center considers participation.

  For about 2 years or so this activity can hopefully continue at McMaster, but after that there is less certainty there.

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