Status Report of the Nuclear Data Project at McMaster University
(April 2000 – April 2001)
(Report prepared by B. Singh April 9, 2001)

ENSDF RELATED WORK:

Permanent responsibility: **A=64, 89, 98, 100, 149, 151, 164, 188, 190, 194.**
A=31-44 region was added at the IAEA (NSDD) meeting in Dec 2000.

During 2000-2001, we also worked on other priority A-chains and nuclides, which are outside our A-chain responsibility.

Mass-chain/Nuclide Evaluations published or submitted since April 2000:

A-chain updates:

A=79: B. Singh, NDS (Submitted March 2001, pre-review stage) **(FY 2001).**

A=86: B. Singh, NDS (Submitted Feb. 2001, pre-review stage) **(FY 2001).**

A=43: J.A. Cameron and B. Singh, NDS (Submitted Dec. 1999, in press) **(*)**.

A=130: B. Singh, NDS (Submitted July 2000, post-review stage) **(*).**

A=164: B. Singh, NDS (Submitted Dec. 1999, post-review stage) **(*).**

A=42: J.A. Cameron and B. Singh, NDS, 92, 1-146 (2001) **(*).**

A=62: H. Jude and B. Singh, NDS, 89, 1-211 (2000) (McMaster's contribution ~30%).

A=40, 41, 42: B. Singh, Coding of Endt's 1998 update (Nucl. Phys. A633, 1) was completed and included in ENSDF in May 2000.

(*): Post-review revisions and further updating to Feb 2001 was done in **FY2001.**

Nuclide updates (by B. Singh):

^{143}Tb: NDS, 92, 429-442 (2001) **(FY 2001)**.

^{143}Dy: NDS, 92, 443-454 (2001) **(FY 2001).**

^{65}Zn: Nuclide update for ENSDF.

^{58}Cu, ^{126}Pr, ^{136}Nd, ^{143}Ho, ^{145}Gd, ^{149}Gd, ^{163}Lu:
Nuclide updates for ENSDF **(FY 2001).**

Superdeformed structures in ENSDF: Data from about 30 primary publications during 2000-2001 for the following nuclides were included in ENSDF in October 2000 and March 2001:

^{36}Ar, ^{58}Ni, ^{59}Cu, ^{68}Ge, $^{80\text{-}83}$Sr, ^{83}Y, 84Zr, ^{88}Mo, ^{89}Tc, ^{91}Tc, ^{143}Eu, ^{191}Hg, ^{192}Hg, ^{193}Pb, ^{197}Pb and ^{240}Pu. (FY 2001)

As of April 9, 2001, we are current on the coverage of SD band data in ENSDF.

Review work: A=92 was reviewed in July-August 2000.

Revision of rules for spin-parity assignments: During 1999-2000, the McMaster group (D.G. Burke, B. Singh and J.C. Waddington) participated actively in formulating revised rules, especially those based on particle-transfer reactions, Log *ft* values, and high-spin reactions. **(partly in FY 2001).**

Compilation of data from recent literature (XUNDL database)

During the last year, about **200** compiled (but checked for level-scheme consistency) datasets were prepared by the McMaster group in ENSDF format using semi-automatic coding procedures as described in the last year's meeting. In addition about **10** compiled datasets received from Jean Blachot in France were reviewed and edited by the McMaster group; and about **25** previous datasets in XUNDL were revised/edited to incorporate newer papers for these nuclides. During summer 2000, we also compiled main high-spin papers for about 10 outdated A-chains in ENSDF. We regularly scan web pages of primary nuclear physics journals (PRL, PR-C, NP-A, PL-B, EPJ-A, JP-G) for current publications in experimental nuclear structure. Presently, we are almost current on the coverage of high-spin papers in XUNDL, except about 8 papers published during March 2001, which are being compiled. A major part of the compilation work since April 2000 has been done by George Reed (undergraduate student at McMaster, working part-time), but each dataset has been checked thoroughly by B. Singh, before submitting it to BNL for inclusion in XUNDL database. About **50%** of the XUNDL work, described above, was accomplished during **FY 2001.**

Work in progress:

A=41. Complete ENSDF style datasets for all reactions and adopted properties. Except for **^{41}K,** all the other nuclides have been completed. We expect to submit this A-chain by the end of April 2001. **(FY 2001).**

A=188. This mass chain in ENSDF dates back to 1990, although a high-spin update was done in 1995. Work is in progress to update all the nuclides in this A-chain, with expected completion during the current fiscal year. **(FY 2001).**

A=40. Work on this mass chain has just started. **(partly in FY 2001).**

^{194}Ir, ^{199}Pb: Nuclide updates, expected completion by September. **(FY 2001)**

Update of SD band data: Continuous update will be done as new papers appear.

Compilation of high-spin papers for XUNDL database: Work will continue on the compilation of (primarily high-spin) data reported in current publications. If time permits, we also plan to compile main high-spin papers for some of the outdated (>7 years or so) A-chains in ENSDF.

Other data-related publications:

Magnetic-rotational bands:
Table of Magnetic Dipole Rotational Bands: Amita, A.K. Jain and B. Singh, Atomic Data and Nuclear Data Tables, **74,** 283-331 (2000).

This project was initiated and guided by B. Singh, and carried out in collaboration with a nuclear theory group in India. The above compilation, with a literature cutoff date of August 1999, contains data for about 120 magnetic-rotational bands observed in high-spin studies for about 56 different nuclides. This month we have completed another update to add data from newer papers on this subject. We expect to submit this update to Atomic Data and Nuclear Data Tables.

Personnel and funding of the data project at McMaster:

J.C. Waddington (Professor, Head of the data group at McMaster), J.A. Cameron (Emeritus-Professor), B. Singh (Nuclear Data Evaluator). Current funding is 0.5 FTE from US DOE and 0.5 FTE from Canadian sources.