

## **Nuclear Data Dissemination**

### **Isotopes Project Lawrence Berkeley National Laboratory**

The Isotopes Project disseminates nuclear structure and decay data on the WWW in collaboration with the Lund Nuclear Data Service. This collaboration has developed Isotope Explorer software for the dissemination of ENSDF, XUNDL, and other ENSDF format databases. The collaboration also disseminates Nuclear Science References with its NSR server and radioactive decay data with the Table of Radioactive Isotopes (TORI) server. In addition, the Isotopes Project provides specialized home pages for researchers in nuclear astrophysics (in collaboration with the Woosley group at the University of California, Santa Cruz); high-spin nuclear structure (in collaboration with McMaster); neutron capture data (in collaboration with the Isotopes Institute, Hungary); and fission data (in collaboration with the GANDS Gammasphere experimental collaboration). Also, a popular educational web site, atomic masses, nuclear moments, atomic data, elemental properties, and other information are provided.

These data are served from both Isotopes Project and Lund servers. ENSDF and NSR data are provided by the NNDC approximately twice a year. XUNDL data are downloaded manually at regular intervals from the NNDC. These data are converted into dissemination format (ENSDF/2 and NSR search indexes) by the Isotopes Project. The TORI database is prepared by combining decay and adopted datasets from ENSDF with the most recent mass data from Audi. The TORI data are then reviewed for consistency and converted into an Access database format for dissemination.

A summary of WWW usage for the Isotopes Project data services during the past three years (from April through March) is given in Table I. Overall usage has nearly doubled each year to over 1,000,000 retrievals the past year. Nearly 280,000 retrievals were performed in the past two months suggesting usage continues to increase rapidly. About 300,000 data requests were for ENSDF datasets with Isotope Explorer. ENSDF usage fluctuates from 10,000-65,000 per month, possibly correlated with preparation for meetings. TORI usage has increased rapidly in its first year with about 15,000 retrievals in March, 1999. NSR usage has slowly increased to about 4,500 reference searches per month. Access to the specialized Isotopes Project home pages has increased to about 16,000 per month.

The Isotopes Project WWW services are accessed by users in virtually every ISO (International Organization for Standardization) country code from Antarctica to Zimbabwe. We service hundreds of inquiries annually for nuclear structure and decay information from students, industry, government, and researchers in many fields.

**Table I. Summary of LBNL Isotopes Project/Lund Nuclear Data Services Usage**

WWW Data Service	Description	Total Usage		
		1996-7	1997-8	1998-9
<a href="#">VUENSDF 1.0</a> (Windows 3.1)	Provides Nuclear Data Sheet style tables, level scheme drawings, plots and charts.	90056	173415	302283
<a href="#">Isotope Explorer 2.2</a> (Windows 95/98/NT)	Serves ENSDF from WWW or Table of Isotopes CD-ROM.			
<a href="#">Isotope Explorer 3.3</a> JAVA/HTML	Isotope retrievals tabulated.			
<a href="#">Table of Radioactive Isotopes</a>	Radioactive decay data including parent properties, $\alpha$ , $\beta$ , and $\gamma$ . Search by energy, A, Z, and half-life.	-	583	83370
<a href="#">NSR Search</a>	Search NSR by any combination of nuclide, author, keynumber, reaction or keyword.	-	17399	38652
<a href="#">Education</a>	Periodic Table of the Nuclides, glossary of nuclear and astrophysics terms.	-	-	10315
<a href="#">Astrophysics</a>	Astrophysics reference list, Hoffman/Woosley and Thielemann reaction rates.	6131	7617	7526
<a href="#">High-Spin</a>	Table of Superdeformed Nuclear Bands and Fission Isomers, Nilsson drawings.	2225	3206	4751
<a href="#">Neutron Capture Gamma</a>	Lone elemental $\gamma$ -ray data, energy-ordered $\gamma$ -ray tables, IAEA (n, $\gamma$ ) CRP data.	-	313	3708
<a href="#">Fission</a>	England/Rider yields, ENSDF fission data, energy-ordered $\gamma$ -ray tables.	-	635	3819
<a href="#">Radioactive Decay</a>	Skeleton schemes, charts, energy-ordered $\gamma$ -ray tables, standards.	4503	5764	8020
<a href="#">Isotopes Project home pages</a>	Specialized data home page access requests.	45598	71875	137210
<b>Total Retrievals</b>	Sum of all data requests	312079	564500	1124697