

NNDC Report FY2012

M. Herman
National Nuclear Data Center
Brookhaven National Laboratory
Nuclear Data Week, Nov. 5-9, 2012

BROOKHAVEN
NATIONAL LABORATORY

a passion for discovery



U.S. DEPARTMENT OF
ENERGY

Office of
Science

NNDC Personnel Status

Personnel changes: Said Mughabghab retired

Staff	FTE	Heads (30/9/12)	FTE-USNDP	FTE-ARRA	FTE-OTHER
Permanent	8.30	8	6.24	0.98	1.08
Temporary	2.00	2	0.44	1.18	0.38
Professional	3.57	4	3.57		
Contractors	2.70	10	2.70		
Total	16.57	24	12.95	2.16	1.46

FY2011

Staff	FTE	Heads (30/9/11)	FTE-USNDP
Permanent	8.05	9	5.23
Temporary	0.50	2	0.30
Professional	3.73	4	3.73
Contractors	2.50	12	2.50
Total	14.78	27	11.76

Coordination and reporting

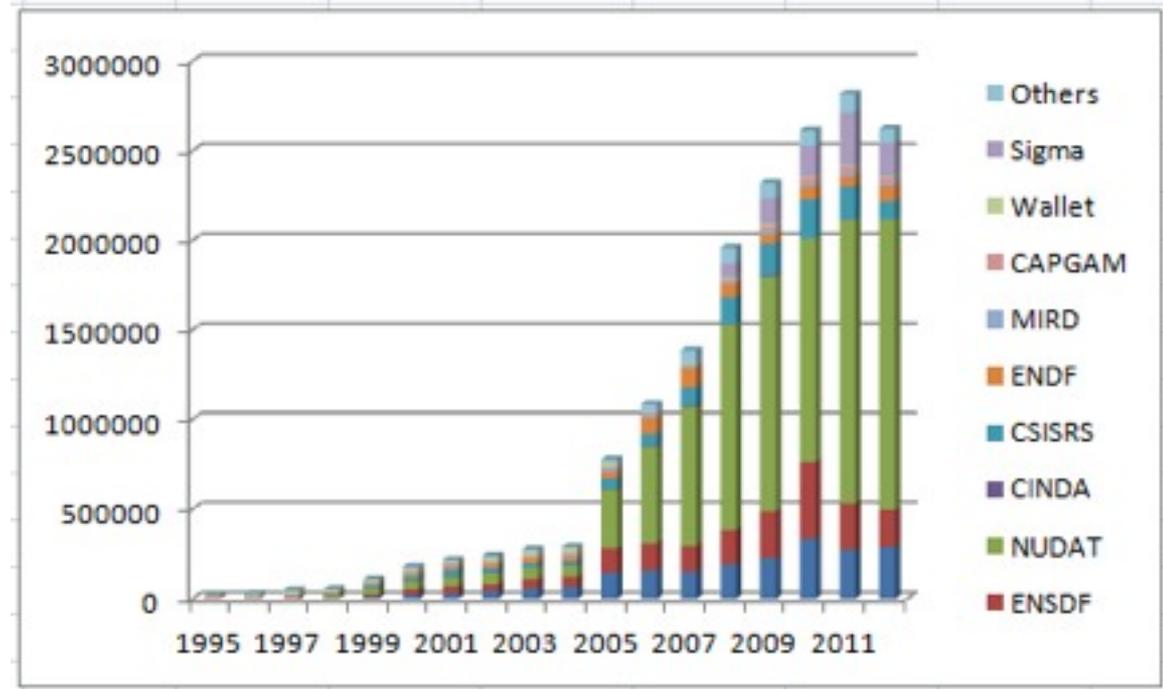
- CSEWG-USNDP Annual Meetings held (Nov 2011)
Summary and Minutes issued (Jan 2012)
- USNDP Budget Briefing FY14 held at DOE-SC (Feb 2012)
- USNDP Report FY11 & Workplan FY13 issued (March 2012)
- **Work on Report FY12 started in October**
OBJECTIVE: have it released in 2012!
- **Work on Work plan FY13 will start early next year**

Web based!
Web based!

The image shows three overlapping document covers for USNDP reports. The leftmost cover is titled "Budget Briefing FY2" and includes the text "DOE HQ, Germantown" and a "Contents" list: 1. Presentations, 2. Accomplishments, 3. Budget Justification, 4. Budget Spreadsheets FY1. The middle cover is titled "USNDP Work Plan for Fiscal Year" and includes the text "Prepared by: Michal Herman, National Nuclear Data Center, Brookhaven National Laboratory, February 2012" and the URL "www.nndc.bnl.gov/usndp". The rightmost cover is titled "Annual Report for FY2011" and includes the text "Prepared by: Michal Herman, National Nuclear Data Center, Brookhaven National Laboratory, March 2012" and a list of contributors: Alan D. Carlson, NIST; Richard Friesen, LLNL; Yoshihiko Kawano, LANL; John Kelley, LLNL; Eric G. Kober, ANL; Balraj Singh, McMaster U.; Michael Smith, ORNL; Alejandro Szorogni, BNL; Neil Summers, LLNL. The URL "www.nndc.bnl.gov/usndp" is also present on this cover.

Services

NSR	291k	+6%
ENSDF	207k	-20%
NUDAT	1,619k	+2%
EXFOR	100k	-46%
ENDF	90k	+48%
SIGMA	188k	-37%



- Data retrievals decreased by 6% to 2.624 million in FY12
- Active communication with users available for NNDC-general, CSISRS, ENDF, Wallet Cards

Compilation

NSR (Pritychenko, Betak*)

- Total: 3,804 new articles (2,315 key-worded)
- NNDC: 2,535 new articles (1560 key-worded),
502 modified changing $Z=114 \Rightarrow \text{Fl}$ and $116 \Rightarrow \text{Lv}$

EXFOR (Pritychenko, Hlavac*, Schwerer*, Dunaeva*)

- 121 new entries including Atlas of Neutron Resonances (1433 subentries), 392 modified entries

B(E2) (Pritychenko, Singh)

- 16 nuclides

Double-beta decay (Pritychenko)

- 10 nuclides and 20 decay modes

*) contractors

ENSDF

9 mass chains completed and submitted (105 nuclides)

Evaluated:

- $A=68$ (McCutchan)
- $A=88$ (McCutchan/Sonzogni)
- $A=87$ (Johnson/Kulp)
- $A=141$ (Nica)
- $A=156$ (Reich)
- $A=230, 251, 253, 255$ (Browne/Tuli)
- $A=211$ (Trieste collaboration)



Published: 11 mass chains ($A=34, 36, 37, 77, 62, 68, 143, 159, 161, 222, 230$)

Reviewed: 7 mass chains

McCutchan (3), Tuli (2), Browne (1), Reich (1)

ENDF/B

- Release of ENDF/B-VII.1
 - final QA procedure and minor corrections
 - publication of the dedicated NDS issue
- Development of ENDF/B
 - work started on reevaluation of Zr isotopes
 - feasibility study on the assimilation methodology
 - upgrading EMPIRE code evaluation capabilities
 - implementation of the ADVANCE system



EMPIRE code

(1038 Svn commits since Nov. 1, 2011)

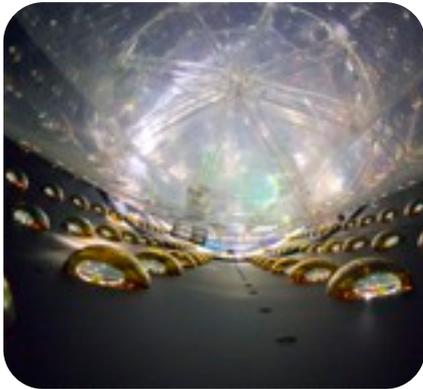
- EMPIRE-3.1 (Rivoli) released March 2012
 - OPTMAN CC code
 - low-K version of EGSM level densities + new parametrization
 - direct access to C4 file with exp data
 - KERCEN code included in the source (not linked through the GUI)
 - tightening cross section balance
 - new test cases and benchmarks
- Post-Rivoli work
 - implementation of PFNS with covariances
 - mu-bar covariances
 - plotting of PFNS and mu-bars with experimental data
 - angular distributions for elastic and inelastic compound x-sec
 - major update of the manual



EMPIRE-3.1 (Rivoli)

State of the art antineutrino spectrum modeling

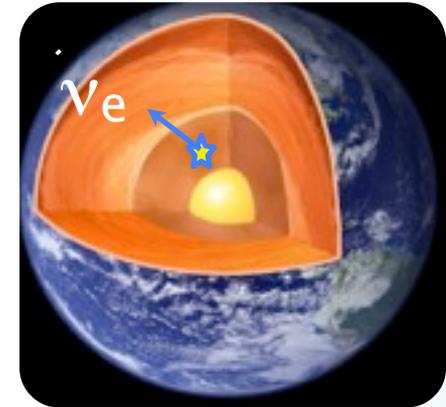
antineutrinos are the ultimate probe



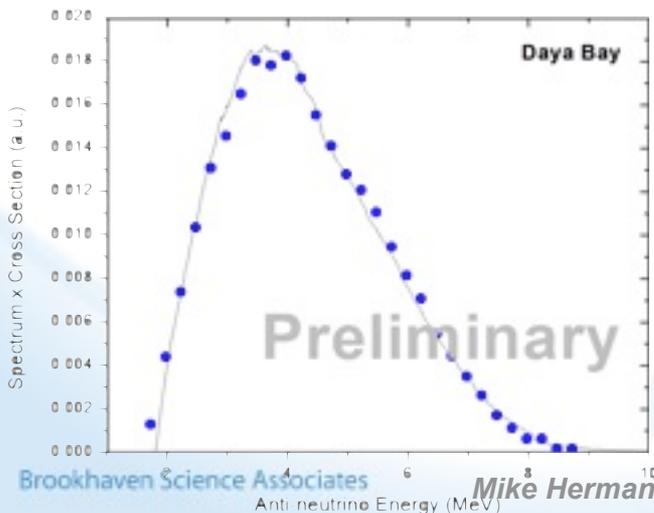
Basic Science:
Study of neutrino oscillations in Daya Bay



Non-proliferation:
safeguards and reactor monitoring



Geophysics:
Earth tomography from long lived radioisotopes



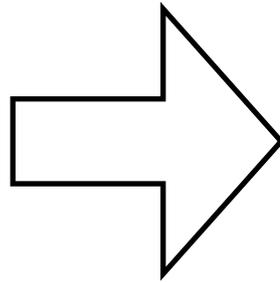
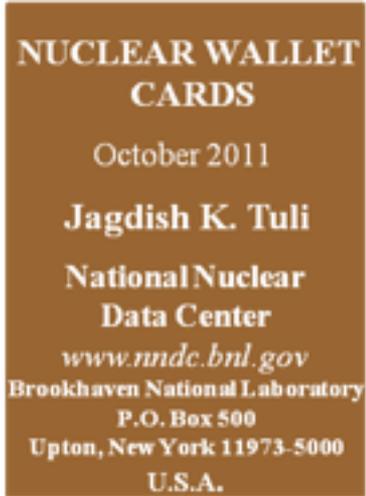
Evaluate, with uncertainties, the anti-neutrino spectrum from β decays of actinides and their fission products and archive them in ENDF/B-VII.2 for applications

Publications

- 11 issues of NDS with A-chain evaluations
- Special issue on ENDF/B-VII.1 published in Dec. 2011 (editorial work Oblozinsky/Pritychenko)
 - ENDF/B-VII.1 Nuclear Data for Science and Technology: Cross Sections, Covariances, Fission Product Yields and Decay Data (NNDC contribution)
 - Neutron Cross Section Covariances for Structural Materials and Fission Products (NNDC)
- papers 18
- reports 3
- invited talks 25



Wallet Cards app for Android



The first mobile application
by NNDC (T. Johnson)



New GForge server (since October 18, 2011)

- Processors: Intel Xeon, two 6-core, 3.46 GHz each
- RAM: 64 Gigabytes
- Total Disk Storage: 15.2 Terabytes
- Collaboration Software: GForge Professional Server 6.0

Worked flawlessly over the year

New Web and data servers to be installed in 2013
NNDC cluster to be updated in 2013.



Management of projects and Web pages

GForge



ControlTier



Project management system

- Versioning system (Svn)
- Tracker
- Mailing lists
- Release system
- Wiki, Forums, Blog, ...

Handy tool for

- Deploying applications
- Controlling their state
- Running administrative tasks across multiple servers
- Updating Web sites

Automatic verification and validation of ENDF evaluations



www.nndc.bnl.gov/ndf/... ADVANCE: The ENDF Continuous Integration System

Neutrons Sublibrary
ENDF/B Development Library

- General Information:
 - ENDF sublib designator: 10
 - Revision Number: 102
 - Last Modified Revision: 532502
- Build Status:
 - Build status: **ALL OK**
 - Build time: 2012-10-24 13:52:00.314153
 - Libfile: neutrons.lib
 - Release Notes: neutrons.release.notes.pdf
- GForge Links:
 - Browse SVN
 - Browse sublibrary tracker

1	H																	2	He																										
3	Li	4	Be													5	B	6	C	7	N	8	O	9	F	10	Ne																		
11	Na	12	Mg													13	Al	14	Si	15	P	16	S	17	Cl	18	Ar																		
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr										
37	Rb	38	Sr	39	Y	40	Zr	41	Nb	42	Mo	43	Tc	44	Ru	45	Rh	46	Pd	47	Ag	48	Cd	49	In	50	Sn	51	Sb	52	Te	53	I	54	Xe										
55	Cs	56	Ba													57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu
72	Hf	73	Ta	74	W	75	Re	76	Os	77	Ir	78	Pt	79	Au	80	Hg	81	Tl	82	Pb	83	Bi	84	Po	85	At	86	Rn																
87	Fr	88	Ra													89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr

Symbol Legend

- X FAILURE: At least one evaluation in the element/sublibrary was so badly done that it conformed a checker code or the checking code has a serious bug
- E ERROR: The evaluation/sublibrary DOES NOT pass all checks
- W WARNING: The evaluation/sublibrary passed all checks, but there were warnings

www.nndc.bnl.gov/ndf/... ADVANCE: The ENDF Continuous Integration System

³He
Neutrons Sublibrary

- General Information:
 - ENDF MAT designator: 225
 - Evaluated date: MAY90
 - Evaluation lab: LANL
 - Evaluation authors: G.Hale, D.Dodder, P.Young
 - Natural abundance: 0.000137 +- 3e-06 %
 - Check out Wikipedia's entry for helium
- Revision Number: 592
- Last Modified Revision: 532582
- Build Status:
 - Build status: **ALL OK** (Submit tracker item)
 - Build time: 2012-10-24 13:50:20.874937
- GForge Links:
 - Browse SVN
 - View current revision
 - Download current revision

Status	Code	# Tests	# Failures	# Errors	Run time (sec)	Files
✓	STAN	0	0	0	0.033	stn.File
✓	STANEF	0	0	0	0.026	
✓	CHECKR	8	0	0	0.012	
✓	FIZCON	8	0	0	0.012	
✓	PSYCHE	16	0	0	0.013	
✓	PREPND	2	0	0	0.041	prepnd.File
✓	INTER	1	0	0	0.018	inter.File
E	(None)	4	0	4	0.014	Log.gfortran.File acc.File, acc.ps.File, cheat.ps.File, cheat.chk.File, genf.File, xsdr.File, xsrort.cox.File
✓	NUOV98	3	0	0	0.796	

Symbol Legend

- X FAILURE: At least one evaluation in the element/sublibrary was so badly done that it conformed a checker code or the checking code has a serious bug
- W WARNING: The evaluation/sublibrary passed all checks, but there were warnings
- ✓ PASS: The evaluation/sublibrary passed all checks

Updated every hour!

