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# NNDC Report

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# NNDC Operations

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## Personnel

- Tom Burrows passed away in July 1, 2008, huge loss to the NNDC and to USNDP, search for replacement is nearing completion
- Caleb Mattoon (Colorado) joined the NNDC in June 2008, postdoc position, cross section covariance data
- Chris Ouellet (McMaster) will join the NNDC in January 2009, postdoc position, nuclear structure data

## Coordination and reporting

- CSEWG-USNDP Annual Meetings'07 held (Nov 2007)  
Summary and Minutes (web only) issued (Dec 2007)
- USNDP Report FY06 & Workplan FY09 issued (Jan 2008)
- USNDP Budget Briefing FY10 held at DOE-SC (Feb 2008)
- **Work on Report FY08 will start after this meeting**
- **Work on Workplan FY10 will start early next year**

# Databases and Services

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## Database management

- NSR, XUNDL, ENSDF, NuDat maintained and distributed regularly
- CSISRS/EXFOR database maintained regularly
- ENDF/B-VII.0 frozen since December 2006, new evaluations in ENDF/A

## **NNDC Web service**, *more details in talk by Boris*

- Data retrievals increased by 41%, 1.961 mil retrievals reached in FY08
  - Driven by NuDat and Chart of Nuclides, retrievals up by 47.5%
  - CSISRS + ENDF retrievals up by 41%
  - NDS IAEA forwards ENSDF, NuDat, QCalc and Nuclear Wallet Cards Web requests to NNDC Web server
- New products
  - Sigma-2.0 released in April 2008
  - MACS & Astrophysical Reaction Rates released in December 2007
- Active communication with users
  - Available for NNDC-general, CSISRS, ENDF, Wallet Cards

# Nuclear Structure Data

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## ENSDF evaluations

- Completed and submitted 7 mass chains (5 NNDC, 1 collaboration), NNDC share = 80 nuclides (last year 77)
  - ✓ ( 5 nuclides Burrows/Gupta)
  - ✓ A = 72 ( 6 nuclides, Sonzogni, collaboration)
  - ✓ A = 97 (14 nuclides, Nica)
  - ✓ A = 102 (14 nuclides, de Frenne)
  - ✓ A = 145 (16 nuclides Browne/Tuli) – in ENSDF
  - ✓ ( 1 nuclide Tuli)
  - ✓ A = 154 (15 nuclides, Reich)
  - ✓ A = 229 ( 8 nuclides, Browne/Tuli)
  - ✓ A = 240 ( 1 nuclide, Browne, collaboration)
- Published 6 mass chains in NDS + 1 in ENSDF
  - ✓ A = 45, 49, 96, 145 (in ENSDF), 229, 240
- Reviewed 11 mass chains
  - ✓ A = 206 (Browne), 127, 147, 169, 182 (Reich),
  - ✓ A = 78, 81 (de Frenne), 107, 108, 111, 214 (Tuli)

# Nuclear Structure Data, ctn'd

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## **NSR bibliography compilation**, *more details in talk by Manojeeet*

- 3,532 (1,908 key-worded, includes 544 from McM.) references compiled
- IAEA contributions (255 key-worded) up-to-date, no backlog for the first time since FY06
- Significant decline in articles published in NPA and EPJ-A. 672 fewer articles in FY08 compared to FY07!

## **NuDat**, *more details in talk by Alejandro*

- NuDat2 maintained regularly, more than 1.1M retrievals in FY08
- The most successful web product (combined with Chart of Nuclides)

## **ENSDF processing and maintenance**

- On average ~21 mass chains are in the production pipeline
- Currently 3045 nuclides in ENSDF

## **Nuclear Data Sheets**

- 11 issues published on ENSDF evaluations, total number of pages 2724
- 1 issue devoted to Covariance Workshop, 200 pages

# Nuclear Reaction Data

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## CSISRS compilation (experimental data)

- 106 papers compiled (33-n, 70-cp, 3- $\gamma$  papers, total 1060 reactions)  
(Last year 145 papers, 638 reactions)

## Evaluation methodology, *more details in talk by Mike*

- Further development of Empire
  - Improved fission channel
  - New parametrization of EMPIRE-specific (EGSM) level densities
  - RIPL-3 updates (discrete levels, om parameters, level densities)
  - Atlas => ENDF, resonance module implemented
  - Extensive paper on Empire-3.0 appeared in NDS Dec 2007
- Progress made in covariance methodology
  - Atlas-Empire-Kalman implementation improved
  - Study of uncertainty minima in optical model cross sections
  - Consistency between thermal cross sections and resonance parameters partially implemented

# Nuclear Reaction Data, ctn'd

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## **Covariance evaluations**, *details in talks by Marco and Caleb*

- Completion of the low-fidelity project
- Covariance estimates for 55-Mn (with ORNL) and 90-Zr in full energy range, for US nuclear criticality safety program
- Assembling starter set of covariances for GNEP, 108 materials:
  - 3 light from LANL, 5 new actinides LANL/ORNL, 9 ENDF/B-VII.0, 14 MA revised BNL, 2 new BNL, 74 low-fidelity partially revised

## **Covariance processing**, *more details in talks by Ramon and Boris*

- Processed all new covariance data in ENDF/A (19-F, 55-Mn, 90-Zr, 233,235,238-U, 239-Pu)
- Processed all 108 files for the GNEP covariance starter file
- Graphical representation of covariances (MF=33) within web retrieval and visualization system SIGMA being implemented