

Argonne Nuclear Data Program

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Program Overview

❑ Nuclear Data **Compilation** & **Evaluation**

- ✓ both nuclear structure & decay and nuclear reactions
- ✓ participate in the activities of US & international ND networks – NSDD, DDEP
- ✓ participate in IAEA CRP and Technical meetings activities

❑ Complementary **Experimental** Nuclear Data Activities

- ✓ in the area of nuclear structure & decay of relevance to basic physics, astrophysics and applied nuclear physics
- ✓ NE applied area – validation of ND models and libraries

❑ Data Dissemination

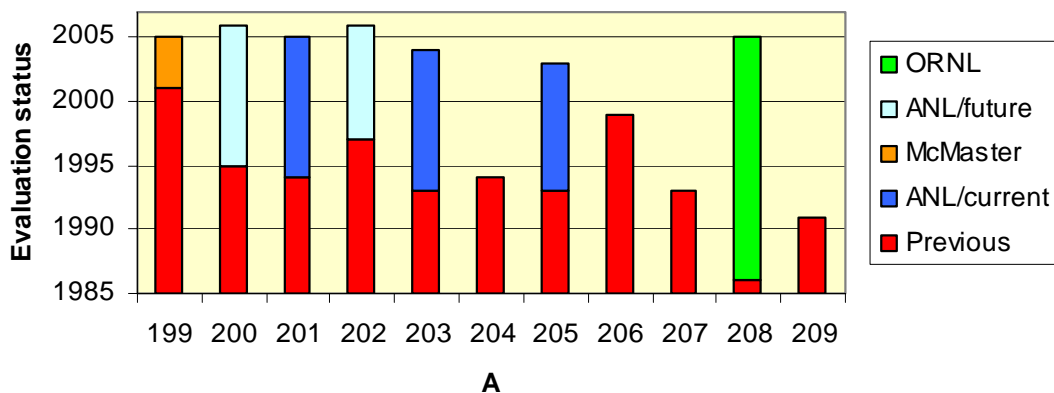
❑ Effort & Funding - ~1 FTE

- ✓ ~0.85 FTE from USDOE/ONP
- ✓ ~0.15 FTE from ANL LDRD (FY04-05)

Evaluation activities

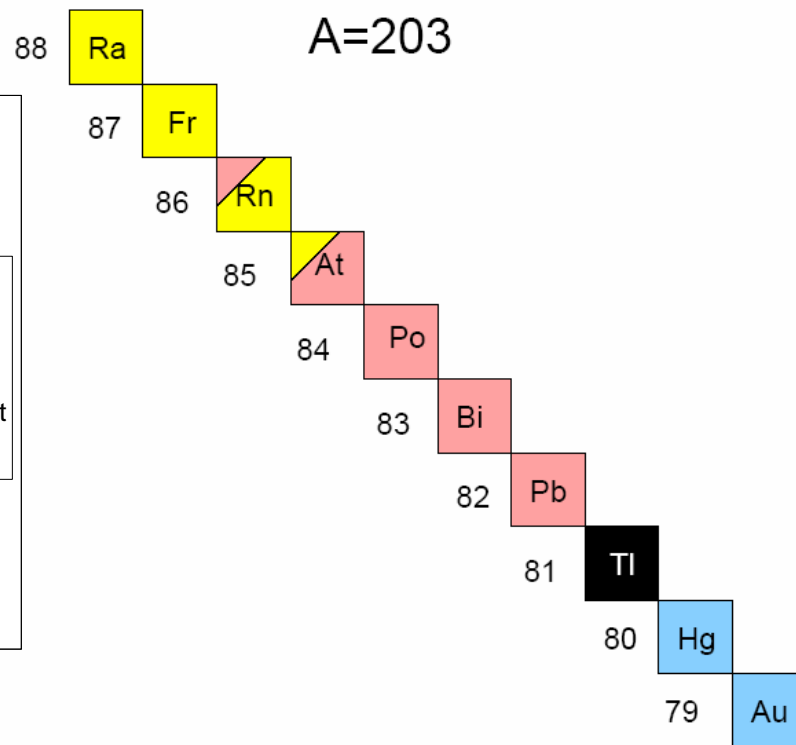
ANL Mass Chain Responsibility

ANL Mass chain status



FY04/FY05

A=203

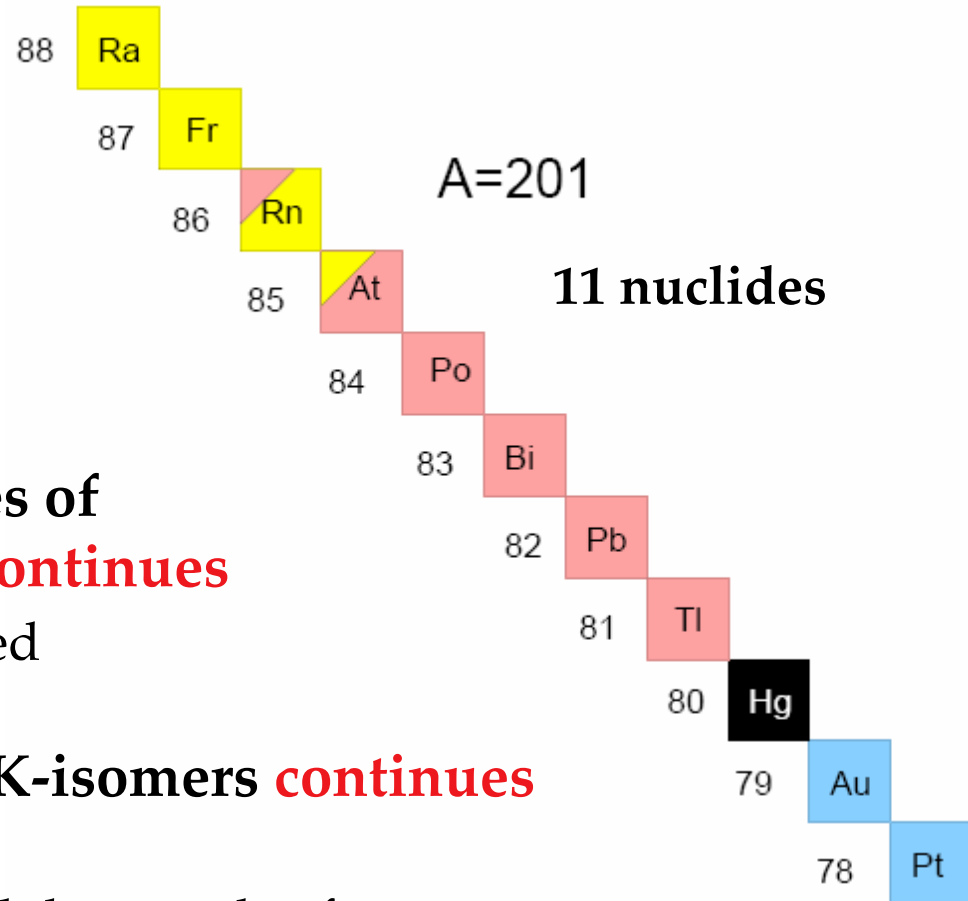


- Member of the INSDD Network, since November 2003
- The ultimate goal is to make this region current in the next 3-4 years

- Completed evaluation for all nuclei with **A=203** for ENSDF
- ✓ Published in *NDS v. 105 (2005) 1*

Evaluation Activities – cont.

FY05



☐ **Completed** evaluation for all nuclei with **A=201** for ENSDF

✓ Reviewed **A=88** and **176**

☐ Evaluation of decay properties of ^{177m}Lu and ^{178m}Hf for DDEP **continues**

✓ One nuclide (^{65}Zn) was reviewed

☐ Evaluation of properties of K-isomers **continues**

✓ In collaboration with ANU

✓ Developed a special methodology and software

✓ Extended the scope – will include all K-Isomers

Other Activities & Current Projects

- ❑ Lecturing at the IAEA/ICTP-Trieste Organized Workshop on “Nuclear Structure Data: Theory and Evaluations” in Trieste
 - ✓ two lectures were prepared and presented at the 2005 workshop
 - ✓ two new lectures will be presented at the 2006 workshop
- ❑ IAEA-CRP on “Updated Decay Data Library for Actinides”
 - ✓ ANL contributions - evaluation ($^{243,245-247}\text{Cm}$, ^{206}Hg , ^{206}Tl) & measurements ($^{243,245-247}\text{Cm}$, ^{233}Pa) in collaboration with I. Ahmad, PHY
- ❑ Other Current Projects
 - ✓ A=200 mass chain evaluation for ENSDF in collaboration with Dr. Stefan Lalkovski, Sofia University
 - ✓ Evaluation of properties of K-isomers in deformed nuclei in collaboration with ANU/Canberra – ANL: A~130, Z=70-73, Z>80
ANU: Z=74-80

Other ND Research Activities

- ❑ Nuclear structure studies of ^{186}Re and $^{185}\text{Re}(n,\gamma)^{186\text{m}}\text{Re}$ of relevance to **nuclear astrophysics** ($^{187}\text{Re}/^{187}\text{Os}$ clock) & **NE applications**
 - ✓ $^{186}\text{W}(d,2n)$ measurements were performed at ANU/CESAR
 - ✓ $^{186\text{m}}\text{Re}$ half-life measurements and $^{185}\text{Re}(n,\gamma)$ and $^{186\text{m}}\text{Re}(n,\gamma)$ cross-section measurements are envisioned in the near future
- ❑ Properties of Nuclear **K-Isomers** in nuclei near $A\sim 180$ and **shell-model isomers** near ^{132}Sn , including decay spectroscopy of FP
 - ✓ Completed studies of ^{174}Lu ; data on ^{174}Yb and ^{179}Ta were published
- ❑ Decay Spectroscopy of **Heavy Nuclei**
 - ✓ Alpha and β^- decay studies of $^{251,253}\text{Es}$, ^{247}Cm , ^{255}Fm – all published
- ❑ **ANL LDRD** on “Development of GeDSSD detectors for γ -ray tracking and nuclear imaging applications” has been completed
- ❑ **Integral ND measurements** at the sub-critical assembly **YALINA**, Belarus – **validation of nuclear models & data**

Other ND Research Activities – cont.

- ❑ ANL has made valuable contributions to various international ND projects
 - ✓ survey of the status of neutron cross section data for **helium producing reactions** relevant to **nuclear fusion applications**
 - ✓ development of improved methods for **representing and propagating errors** in both experimental and derived nuclear quantities and improved covariances methodologies for the nuclear data files
 - ✓ contribution to the IAEA Technical Document that will serve to document the new **International Neutron Cross Section Standards File** that is to be adopted by ENDF/B-VII
 - ✓ contribution to the IAEA Technical Committee Meeting on **Nuclear Data for the International Fusion Materials Irradiation Facility (IFMIF)**, FZK, Karlsruhe, Germany, October 4-6, 2005.

Nuclear Data Dissemination

NUCLEAR DATA AND MEASUREMENTS REPORTS

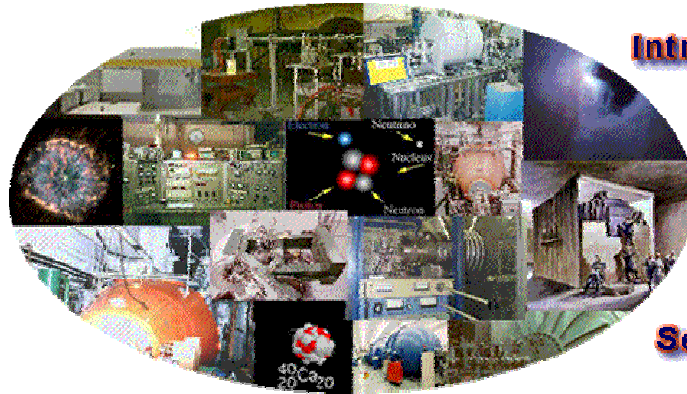
[URL: http://www.td.anl.gov/reports](http://www.td.anl.gov/reports)

- ❑ The site contains more than **160 publications** produced since **July 1973** and it is devoted to:
 - ✓ measured microscopic nuclear data parameters
 - ✓ experimental techniques and facilities
 - ✓ analysis, correlation and interpretation of nuclear data
 - ✓ compilation and evaluation of nuclear data
- ⇒ Original reports by **A.B. Smith** and many others!

Nuclear Data Dissemination – cont.

Experimental Resources for Nuclear Data Studies in the United States

www.td.anl.gov/nrs



Introduction

Facilities & Programs

Related Sites

Contact

Search

www.td.anl.gov/NDP



These sites are current and we plan to significantly upgrade them during **FY06** !

