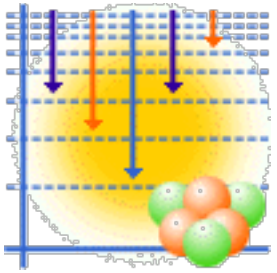
Argonne NATIONAL LABORATORY

Member of the US Nuclear Data Program

Argonne Nuclear Data Program

Filip G. Kondev
NE Division

Program Overview (FY14)



- ***Nuclear Data Compilations & Evaluations***
  - ✓ nuclear structure & decay data compilations and evaluations for the International NSDD network (ENSDF & XUNDL)
  - ✓ decay data evaluations & measurements for IAEA-CRP & other horizontal evaluations (K-isomers, AME & NuBase, medical isotopes)
- ***Complementary ND Research Activities***
  - ✓ basic and applied nuclear physics & astrophysics

Compilations & Evaluations

ENSDF related

- ✓ **A=109** (S. Kumar, J. Chen & F.G. Kondev) – near completion
- ✓ addressing post-review comments: completed **112** (with S. Lalkovski); **A=209** (J. Chen & F.G. Kondev) near completion
- ✓ work in progress: **A=188** (with S. Juutinen, Jyvaskyla University and D. Hartley, US Naval Academy); major revision of **A=177** (F.G. Kondev)
- ✓ others: **A=174** (with X. Huang, CNDC & T. Kibedi, ANU) and **A=173** (with S. Erturk, Turkey & T. Kibedi, ANU) – it is a very time-consuming process - no progress was made by the trainees - **terminated**
- ✓ ported the main ensdf programs to OS X – fmtchk, ruler, ensdat, alphad, logft, pandora, radlst, alphad, gabs, gtol & T. Kibedi (ANU) has ported bricc, avetools, briccmixing – made available through NNDC and IAEA
- ✓ IAEA meeting on ensdf code development - work on the ruler code (*presentation*)
- ✓ two lectures were prepared and presented at the ICTP-IAEA workshop – contributed to the A=227 evaluation (^{227}Ra)

XUNDL

- ✓ **8** compilations for XUNDL; ***xls2ens*** python package for XUNDL compilers (*presentation*)

Compilations & Evaluations – cont.

- AME & NUBASE - continue contributing – *separate presentation*

- IAEA-CRP on "Nuclear data for charged-particle monitor reactions and medical isotope production" – led by R. Capote (IAEA-NDS)
  - ✓ decay data evaluation of ^{44}Ti and ^{67}Cu
  - ✓ evaluation of Auger emitters: ^{99m}Tc, ^{103}Pd, ^{111}In & ^{178}Ta
  - ✓ measurements: ^{66}Ga, ^{86}Y(positron emitter), ^{67}Cu ($\beta-$ therapeutic & SPEC imaging)

- Horizontal evaluations "Configurations & Hindered Decays of K-Isomers in deformed nuclei with A>100" – *separate presentation*

Nuclear Data Research Activities

presentation at the Friday USNDP session

- **Nuclear Structure Data Research:** approved experiments (PI and collaborator) at world's leading NP facilities: **ANL** (ATLAS & CARIBU) with M. Carpenter, C. Chiara, J. Clark, R. Janssens, G. Savard, D. Seweryniak, S. Zhu, **NSCL** (A. Gade & S. Liddick), **RIKEN** (H. Watanabe), **Osaka** (E. Ideguchi) & **Orsay** (G. Georgiev)

- **Decay studies of actinide nuclei and nuclei relevant to Medical Isotopes applications** with I. Ahmad & J. Greene (ANL-PHY) & T. Kibedi (ANU) (ND improvements for the Auger Emitters)

- **Contribution to the MANTRA project (ARRA funded) – "Measurement and Evaluation of Actinide Neutron Cross Sections Relevant to Advanced Fuel Cycles via Accelerator Mass Spectroscopy"** with R. Pardo (ANL-PHY), G. Youinou, G. Palmiotti & M. Salvatores (INL), G. Imel (ISU)

Future (FY15 and beyond) Plans

- **Continue XUNDL & ENSDF activities** – the main collaborative activities within USNDP & NSDD

- **Continue AME & NuBase collaborative activities** – next distribution 2016

- **Continue IAEA-CRP activities on medical isotopes & improving the ND for Auger emitters**
  - ✓ collaboration with the ANU group to address the ND deficiencies

- **Continue research activities** with emphasis on **nuclear structure physics and astrophysics, and their intersection with the applied nuclear physics:**
  - ✓ **ATLAS/CARIBU** – nuclear structure, masses & astrophysics, beta-delayed gammas & neutrons, fission yields …
  - ✓ **GRETINA** at MSU and ANL – nuclear structure & astrophysics
  - ✓ **NSCL (FRIB), RIKEN & Osaka** – nuclear structure & astrophysics

Personnel & Effort – FY14

- **0.8 FTE staff (ND) + 0.2 FTE (LDRD + ARRA)**
- **0.5 FTE post-doc (ND) + 0.5 FTE (LDRD + ARRA) – will join NSCL/FRIB**
- **Prof. Suresh Kumar (visiting professor at ANL -** *recipient of the prestigious INDO-USA Research fellowship*) **– 1 year on sabbatical from University of Delhi – no cost to ANL-ND**

Major Accomplishments – FY14

Compilations	8
Evaluations	0
Disseminations	40000
Reports	0
Journal Publications	26
Invited Talks	5
Contributed Talks	3

- ✓ completed all **ENSDF** evaluations in the **A=199-209** region of ANL responsibilities;
- ✓ completed the horizontal evaluation on **K-isomers in deformed nuclei with A>100;**
- ✓ completed the decay data measurements on **67Cu**

- **Issues (FY15 & beyond): ARRA & LDRD funding expired - flat-flat DOE/ONP funding in FY10-FY12, FY14 and 8% reduction in FY13**
  - ✓ flat-flat consequences - ANL staff will be funded at **~0.8 FTE?**