

## **Status of ENDF/B-VIIbeta3**

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# Complete (14 sub-libraries) precursor of ENDF/B-VII.0

- contents of beta3 the same as of beta2
- 87 updates in the neutron sub-library
- small (but many) changes in the decay sub-library
- cosmetic changes to the standards sublibrary





## Changes in actinides

- Nubars for the <sup>233,235,238</sup>U and
  <sup>239</sup>Pu + n adjusted so that they conform to the ENDF/B-VII standard <sup>252</sup>Cf nubar
- New fission energy release for <sup>235,</sup> <sup>238</sup>U, and <sup>239</sup>Pu according to Madland (MT=458)
- Post-fission beta-delayed gammas for <sup>235</sup>U and <sup>239</sup>Pu (MT=460)
- Updated covariances for <sup>232</sup>Th

- Resonance parameters in <sup>237</sup>Np replaced by JENDL-3.3, in the URR the fission width modified to reproduce LANSCE <sup>237</sup>Np/<sup>235</sup>U fission data by F.Tovesson and T.Hill, some typos corrected
- More reasonable (n,γ) and (n,f) cross sections at thermal for <sup>239</sup>U+n
- Revised (cleaned up) description part for <sup>233,235,238</sup>U and <sup>239</sup>Pu (thank you Phil<sup>1</sup>)





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# ... in fission products (Z=31-68)

- Updated covariances for 152,153,154,155,157Gd
- New evaluation for 90Zr (BNL)
- New covariances for 89Y and 99Tc
- Set of fixes by D. Brown (LLNL) interpolation and MF=12
- Set of fixes by V. Pronyaev (IPPE) updates of RR to agree with Atlas (Mughabghab:06)
- Fixed energy balance for a number of materials by adjusting γ-multiplicities in MT=91 and, in some cases, also for (n,2n)
- Reduced number of sections in 103Rh ((n,α) to discrete levels eliminated)





## ... and in other materials

- New evaluations for 191,193Ir (BNL,LANL) including covariances
- Restored full covariances (from ENDF/B-VI.8) for 7Li
- Modified alpha production in 56Fe
- Thermal capture adjusted to Atlas for 201Hg
- Thermal capture adjusted to Atlas for 208Pb and the neutron width of the 153.25 keV resonance reduced by factor of 10





# Changes in Standards and Decay

#### **Standards**

Interpolation scheme was changed to be the same as in the ENDF/B-VII.b3 general purpose files

#### **Decay Data**

- ensuring that sums of the branching ratios add up to 1; fixing rounding problems
- Kratz-Herrmann systematics used for neutron-rich nuclides with unknown values of beta delayed neutron emission branching ratios and half-lives
- about 1000 materials out of 3838 revised





## ENDF/B-VIIb3 release summary

- Large number of files still affected by changes, however these are to a large extent cosmetic and do not have strong impact on benchmarking (except 90Zr)
- NJOY-99.161, released along with beta3, fixes most of the problems reported earlier (thanks Bob and Skip <sup>(\*)</sup>)
- Three extensive validation efforts
  R. MacFarlane & A. Kahler (LANL)
  - S.C. van der Marck (NRG)
  - Jean Christophe Sublet (Cadarache)

Codes employed in verification/ validation: NJOY-99.161, MCNP-4C3, MCNP-5, PUFF-IV, ERRORJ-2.3, CALENDF-2005, TRIPOLI-4.4.1

Problems reported by Sublet

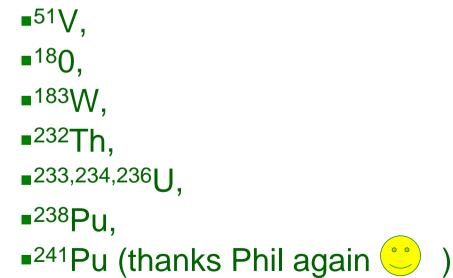
(on Sun Sparc 64, OS Solaris, F90/95 Sun Studio 10)

- 133Ba doesn't run through UNRESR
- H1 and Ho166m don't run through HEATR, GASPR and PURR



## Submitted changes for ENDF/B-VII.0

- <sup>241</sup>Am corrected energy grid (Phil Young)
- <sup>156</sup>Gd updated covariances in RR (L. Leal)
- <sup>152,153,154,155,156,157,158,160</sup>Gd updated covariances
  - in the fast neutron region (D. Rochman)
- Corrected photo-nuclear files (MF=4,MT=50,51, ... moved to MF=6) for :







## Conclusions

# ENDF/B-VIIb3 = ENDF/B-VII.0 (or nearly) Eventual changes will not affect benchmark results ENDF/B-VII.0 files will undergo verification (but not validation!) ENDE/B-VII.0 will be accompanied by the specific

ENDF/B-VII.0 will be accompanied by the specific version of NJOY (-99.161?)

#### Library verification: Ramon ...



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