

# Status of the JEFF project

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- From JEFF-3.0 to JEFF-3.1

Arjan Koning

NRG, Petten, the Netherlands

WPEC-meeting, Aix-en-Provence, May 26-28, 2004

# General

- Before 1994: JEF-2.2: nuclear data for existing reactors and fuel cycle. EFF-2: fusion.
- After 1994: JEFF-3.x: nuclear data for existing reactors and fuel cycle, innovative reactor concepts, transmutation of waste, industrial applications, fusion, medical, and others.
- JEFF-3.x includes European Fusion File (EFF) and European Activation File (EAF)

# Organisation

- Chair: Arjan Koning, NRG (- 2003: Robert Jacqmin, CEA)
- General meeting: Evaluations, processing and benchmarking
- Working Groups:
  - Experimental activities: Peter Rullhusen, IRMM
  - Radioactive Decay and Fission Yield data: Olivier Bersillon, CEA/DAM
  - Fusion data (EFF group) : Robin Forrest, UKAEA
- Secretariat : Ali Nouri, NEA Data Bank

Two JEFF-meetings per year, with 30-40 participants

# Highlights from the JEFF meetings

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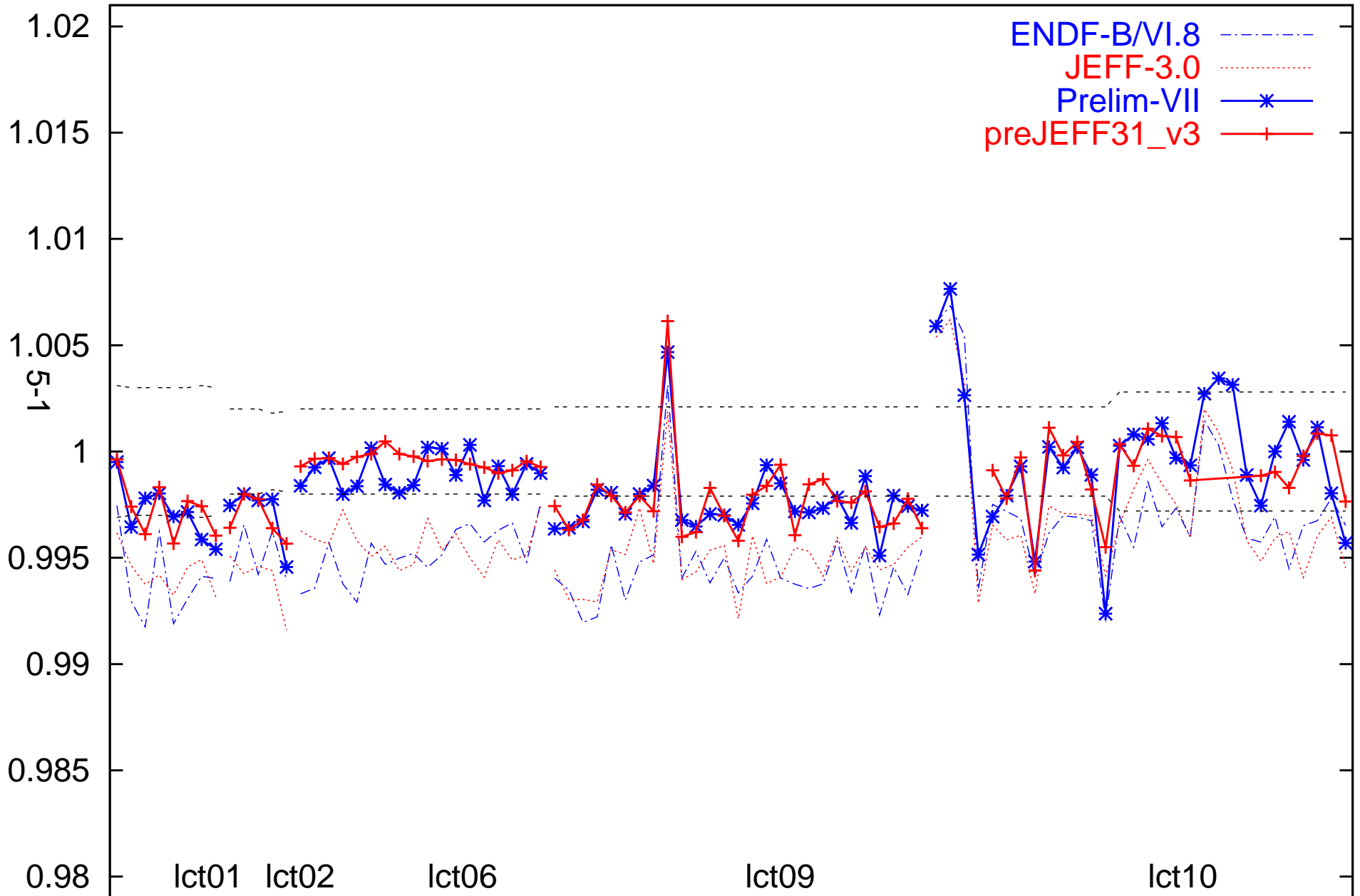
- New evaluations for the Ti isotopes (Vienna, EFF), the W- isotopes (FZK, Vienna, EFF), the Ca, Sc, Fe, Ge, Pb and Bi isotopes (NRG), U-238, Rh-103 and I-127,129 (CEA)
- Various formatting and processing problems identified.
- Development of both experimental and nuclear model based covariance determination (Vienna).
- Decision to upgrade the decay constants for all actinides in JEFF-3.1 to an 8-group structure.

# Highlights from the JEFF meetings

  
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- Extensive benchmarking schemes for JEFF-3.0 (mostly criticality)
- Very promising progress for U-238 file (CEA)
- Improved thermal scattering data (UT Stuttgart).

# leu-comp-therm (1)



benchmark name

# Highlights from the JEFF meetings

  
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## Activation library:

- JEFF-3.0/A = EAF-2003 in ENDF-6 format
- EAF-2004 will be extended to 60 MeV (using the TALYS code).

## Decay data and fission yield file:

- New decay data added
- significant effort from CEA

# Highlights from the JEFF meetings

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7 high-priority experiments for JEFF identified:

- (n,gamma) on Hf isotopes between 1 and 100 eV, with 2% accuracy, for naval reactor studies
- thermal U-235 fission spectrum (discrepancies exist)
- Pu-239(n,gamma) and Pu-239(n,f) between 0.01 and 0.5 eV, with 2% accuracy
- Am-241,242m(n,gamma) in the resonance range
- Gd-155,157(n,gamma) at thermal energies, with 2% accuracy
- U-238(n,gamma)
- O-16(n,alpha) between 2 and 7 MeV

# Highlights from the JEFF meetings

  
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## Ongoing experiments:

- inelastic scattering on Cr-52, Pb and Bi-209 with the (n,n'g) technique (Geel)
- Activation cross sections for Zr, Ni-58 and Cr-50 (Geel)
- Capture and transmission: Pb-206, Bi-209, Rh-103, Pu-240, Pu,242 (Geel)
- Capture: Fe-56, Au-197, Sm-151, Bi-209, Pb-204, Pb-206, Pb-207, Pb-208, Th-232, La-139, Mg-23, Mg-24, Mg-25, Os-186, Os-187, Os-188, Zr-isotopes, U-233, U-234, U-236, Np-237, Pu-240, Cm-241, Cm-245 (CERN).

# Highlights from the JEFF meetings

  
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## Fusion:

- Important evaluations: Ti, W
- Test Blanket Module experiment (ENEA) for ITER + associated data validation with MCNP (neutron spectrum, Li-6 production, shielding, heating, etc.)
- Sensitivity studies (DORT and SUS3D)
- 55 MeV activation benchmark on Eurofer
- Decay heat measurements and validation with EAF-2003 and FISPACT.

# From JEFF-3.0 to JEFF-3.1

- JEFF-3.1 foreseen for May 2005.
- Nuclear industry (France) wants JEFF-3.1 in autumn 2005
- Starter file JEFF-3.1T assembled November 2004.
- JEFF-3.1 includes new evaluations and updates of JEFF-3.0 files

# From JEFF-3.0 to JEFF-3.1

New data for neutrons:

- Ca-40, 42, 43, 44, 46, 48 (0-200 MeV, NRG)
- Sc-45 (0-200 MeV, NRG)
- Ti-46, 47, 48, 49, 50 (0-20 MeV, IRK Vienna)
- Fe-54, 56, 57, 58 (0-200 MeV, NRG)
- Ge-70, 72, 73, 74, 76 (0-200 MeV, NRG)
- Rh-103 (0-20 MeV, CEA/Cad)

# From JEFF-3.0 to JEFF-3.1

- W-182, 183, 184, 186 (0-20 MeV, IRK Vienna, end of 2005 )
- Pb-204, 206, 207, 208 (0-200 MeV, NRG)
- Bi-209 (0-200 MeV, NRG)
- U-238 (0-30 MeV, CEA)
- Am-241 (thermal, CEA)
- Many nuclides ((n,gamma) and (n,f), N-TOF)

Decay and fission yield data file for JEFF-3.1: April 2005.