Decay Data Library In ENDF/B-VII

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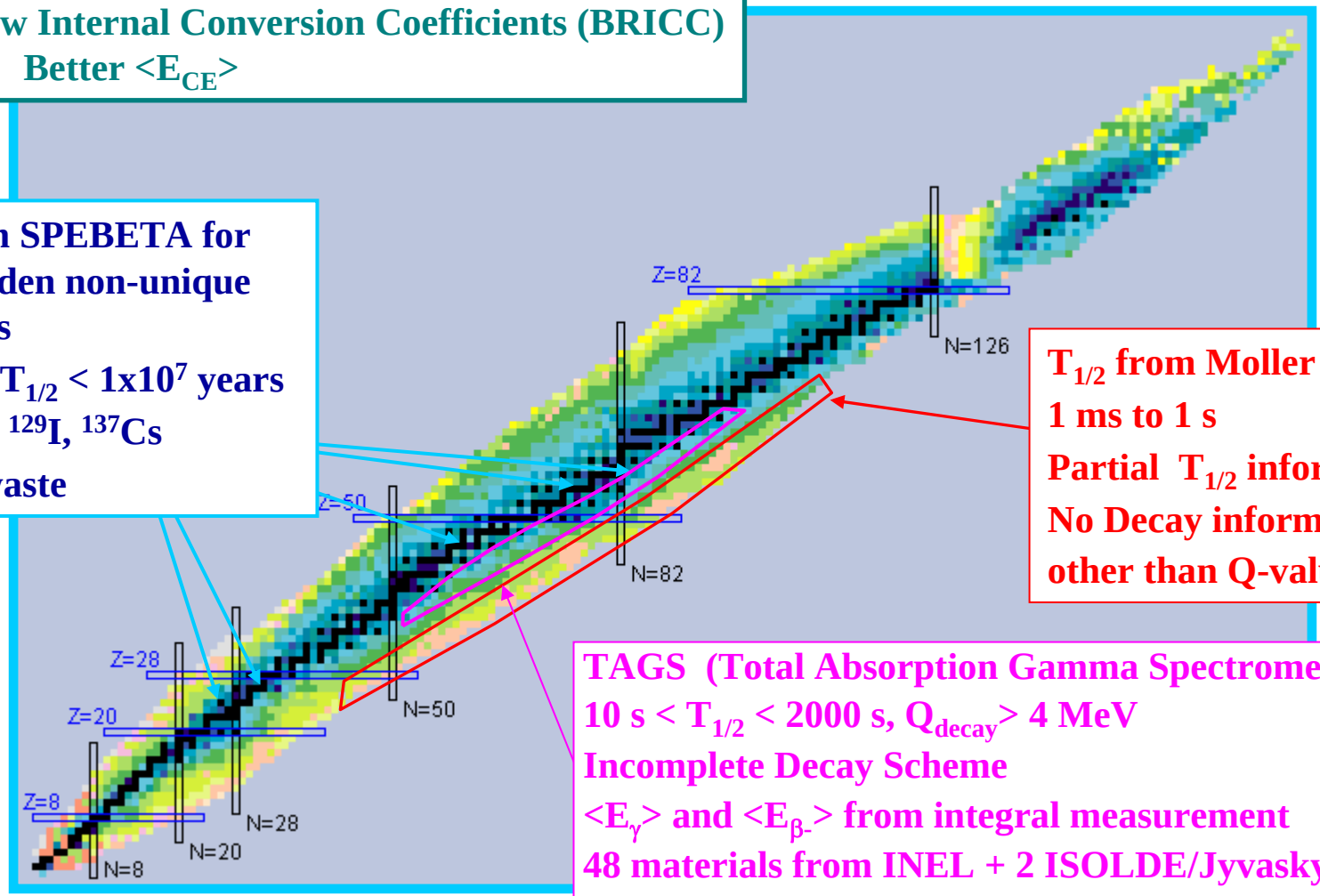
Methodology

- New ENDF/B-VII.0 decay data library
- Main sources:
  - Evaluated Nuclear Structure Data File (ENSDF), continuously updated
  - 2005 Nuclear Wallet Cards by J. Tuli (NNDC)
- Covers all nuclides from neutron (Z=0) to Rg (Z=111)
- 3830 materials
- Previous version done during 1988-1993 covering 979 materials

Methodology

Use of new Internal Conversion Coefficients (BRICC)
→ Better $\langle E_{CE} \rangle$



$\langle E_\beta \rangle$ from SPEBETA for 2nd forbidden non-unique transitions
44 days < $T_{1/2}$ < 1×10^7 years
^{36}Cl, ^{99}Tc, ^{129}I, ^{137}Cs
Nuclear waste

$T_{1/2}$ from Moller *et al.*
1 ms to 1 s
Partial $T_{1/2}$ information
No Decay information other than Q-value

TAGS (Total Absorption Gamma Spectrometer)
10 s < $T_{1/2}$ < 2000 s, Q_{decay} > 4 MeV
Incomplete Decay Scheme
$\langle E_\gamma \rangle$ and $\langle E_{\beta-} \rangle$ from integral measurement
48 materials from INEL + 2 ISOLDE/Jyvaskyla
Subject of WPEC Subgroup 25

Decay Heat Calculations

Decay Heat (t)=

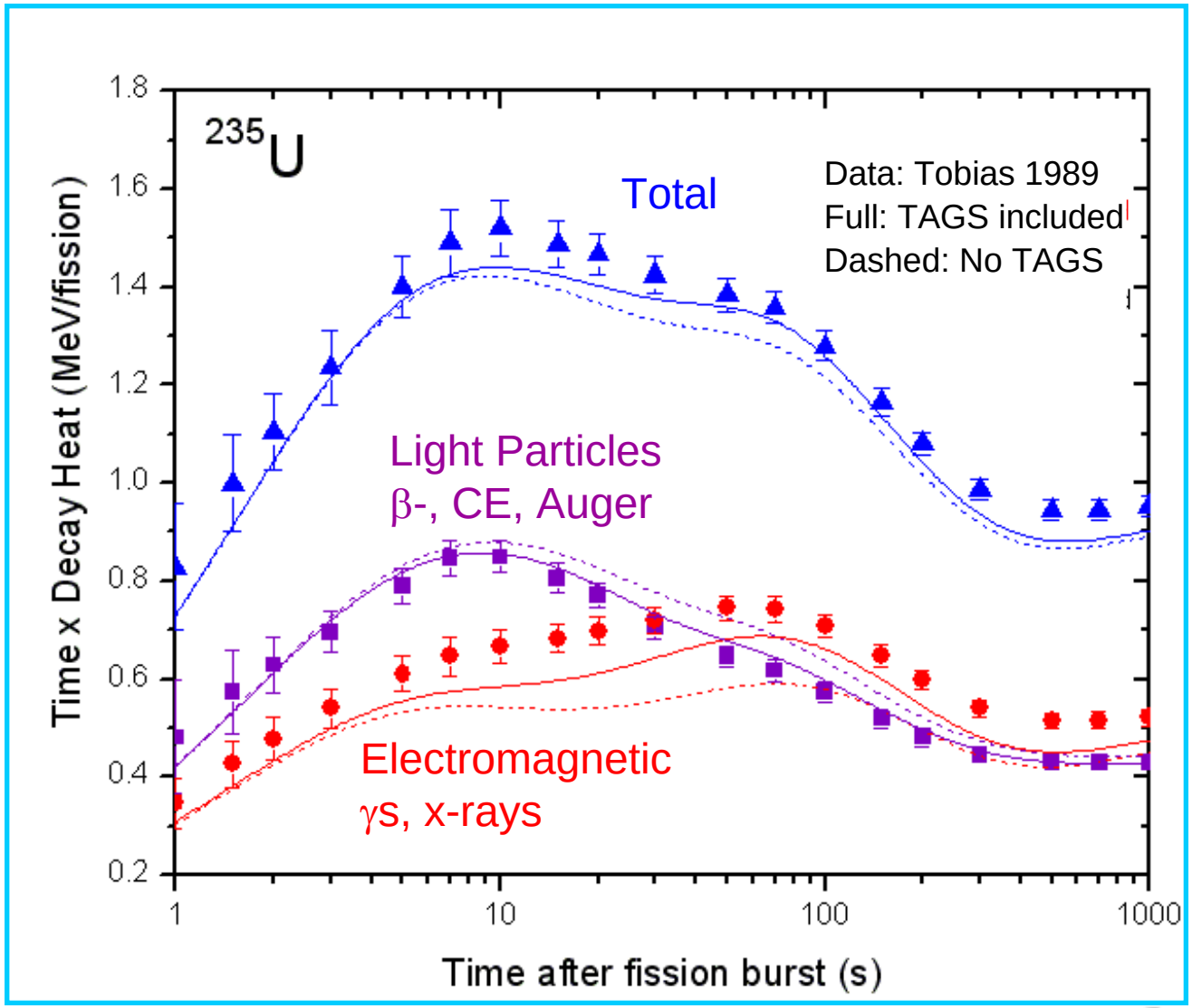
$\Sigma \lambda_i \times N_i(t) \times E_i$

E_i: energy released in decay

More than 800 nuclides in ^{235}U fission

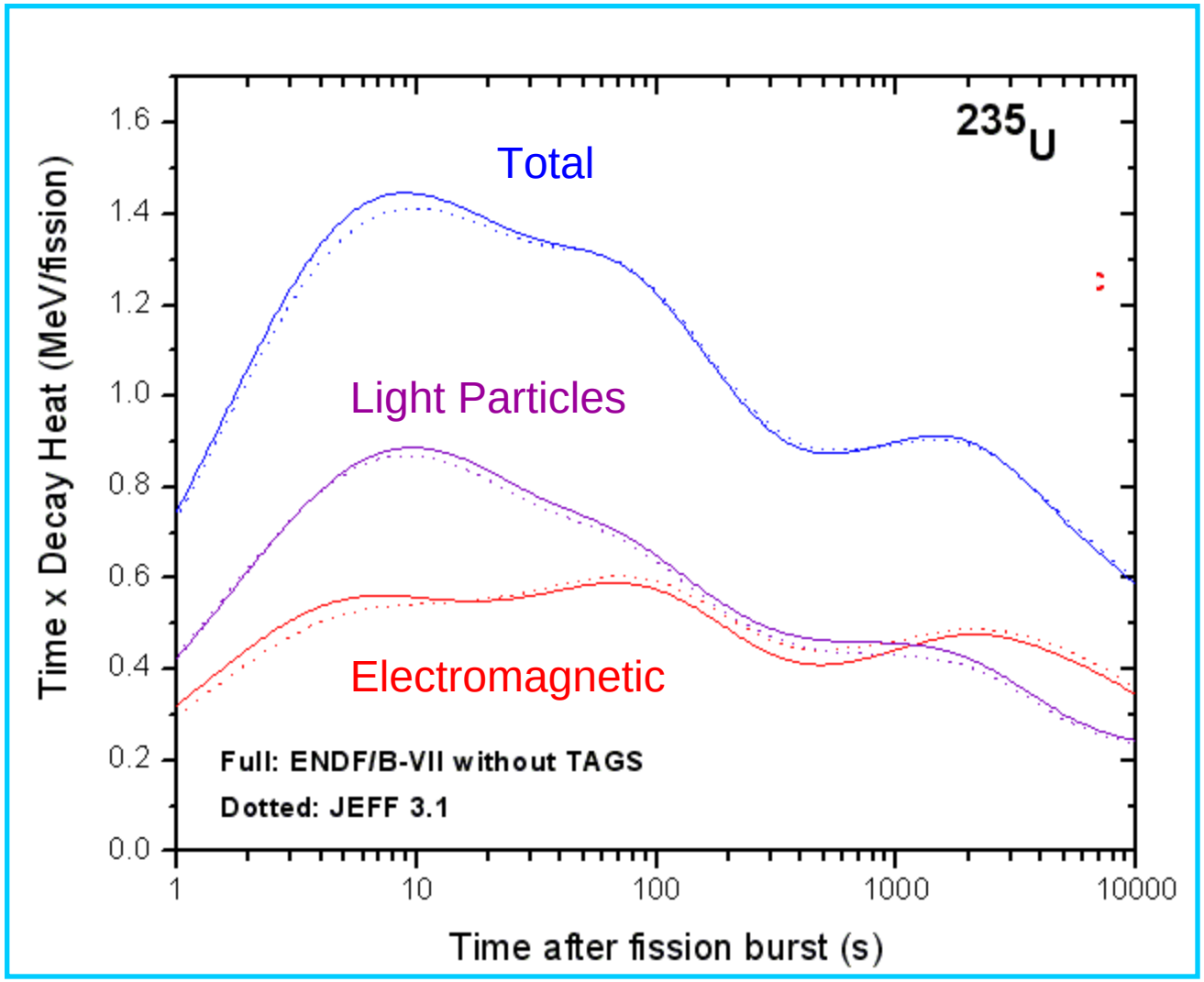
TAGS=Total Absorption Gamma Spectrometer

INEL TAGS data significantly improves decay heat calculations

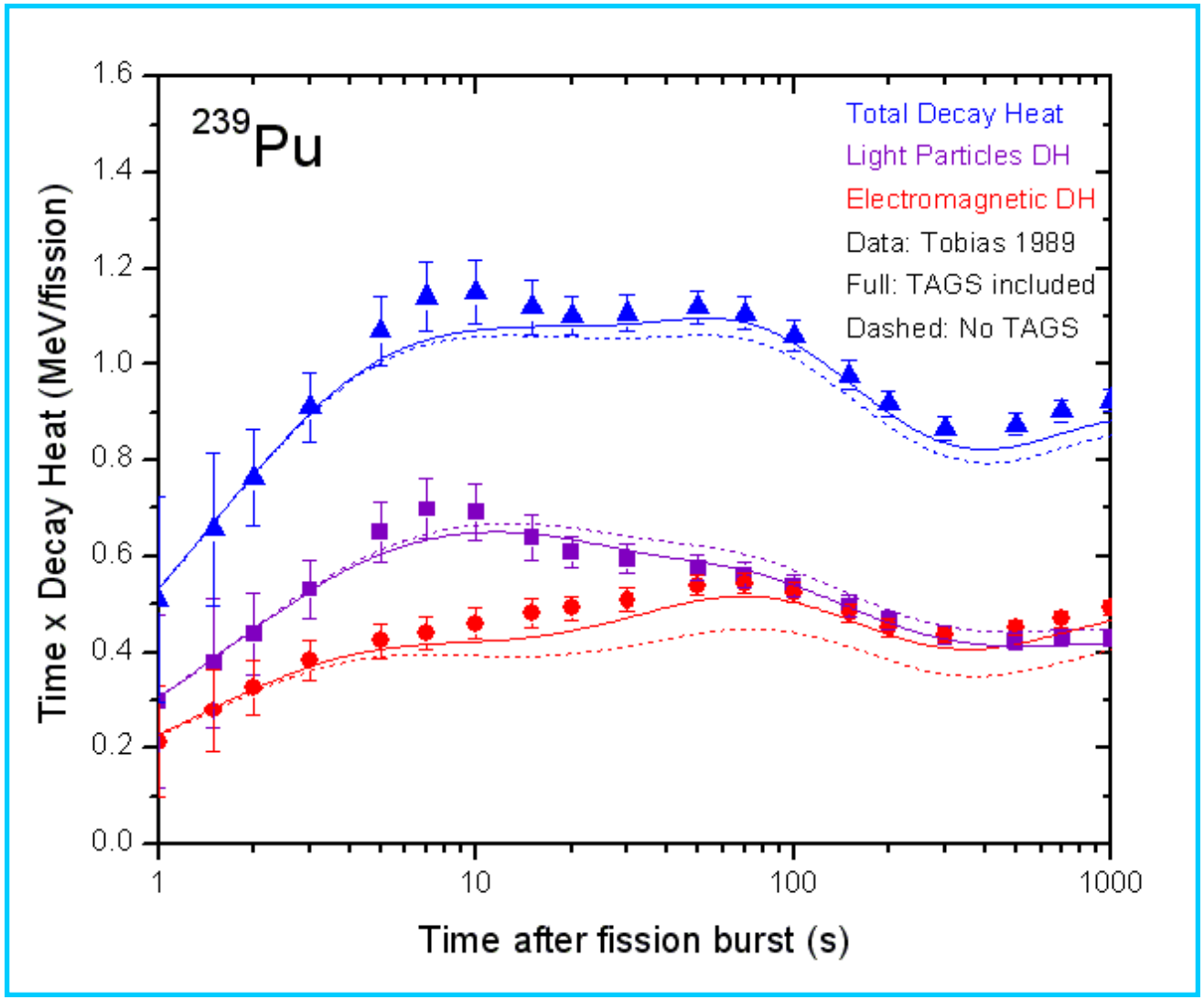


Decay Heat Calculations

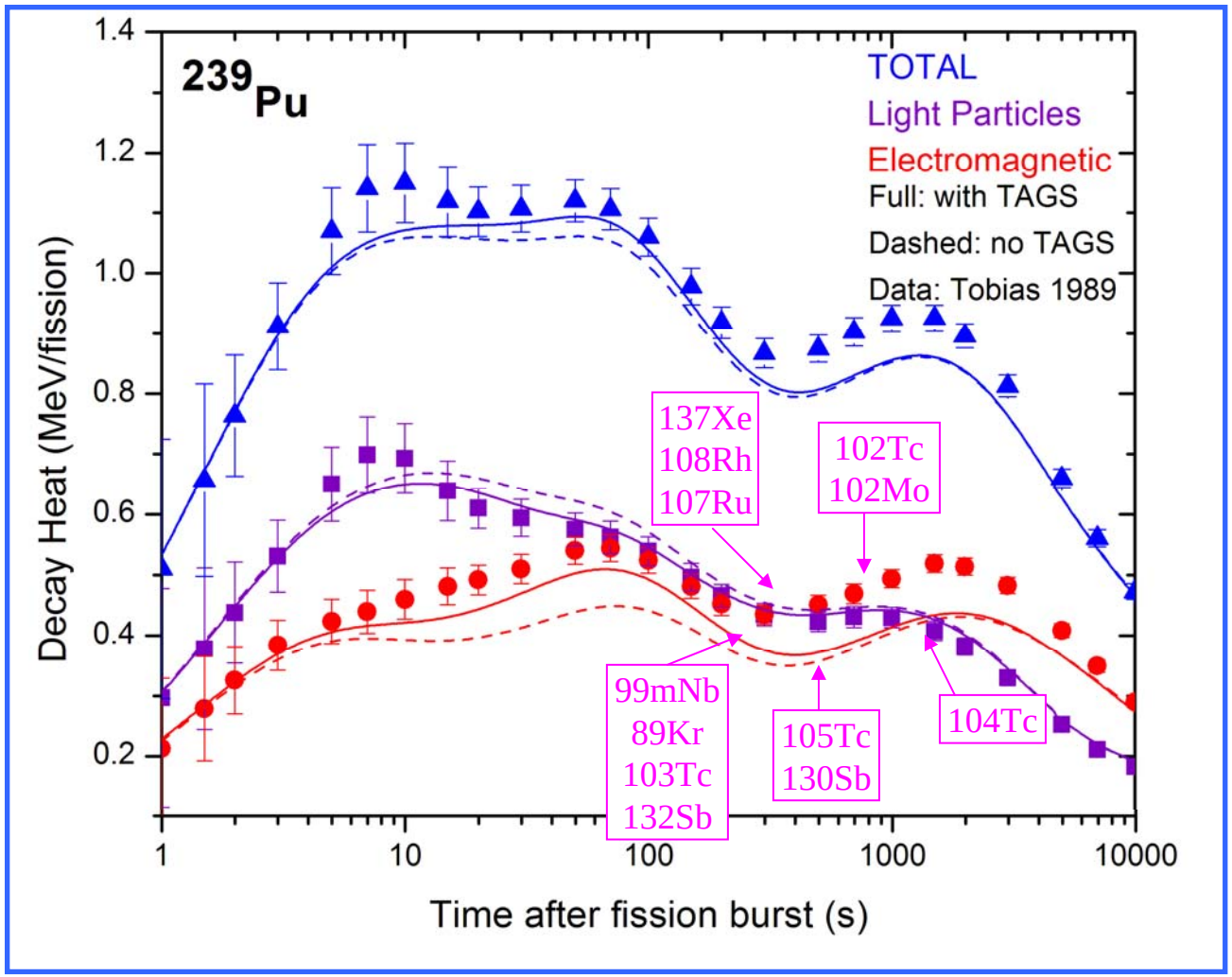
Comparison between JEFF 3.1 decay data library (2005) and ENDF/B-VII β2 decay data library (2006)



Decay Heat Calculations

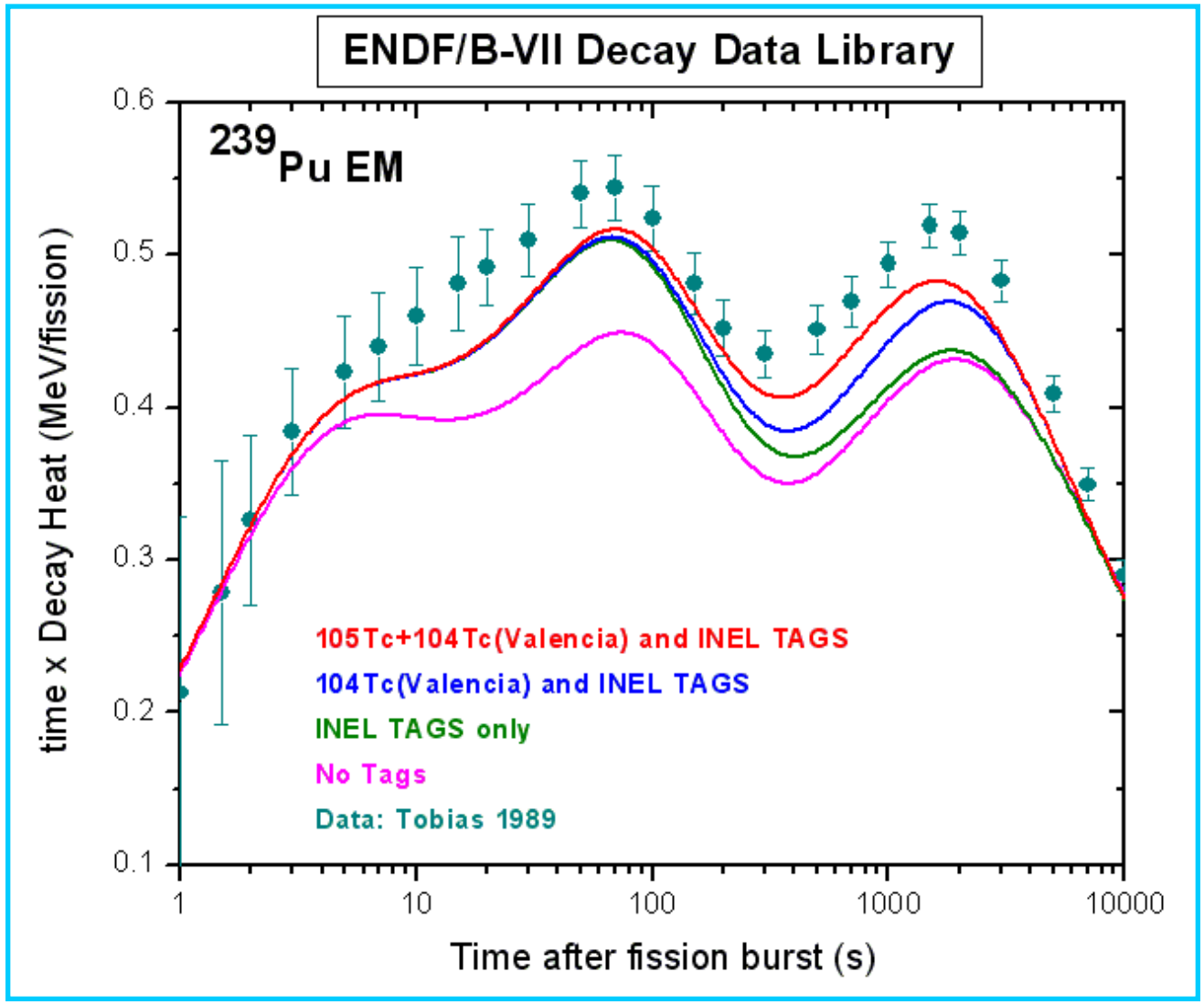


^{239}Pu Sensitivity Study

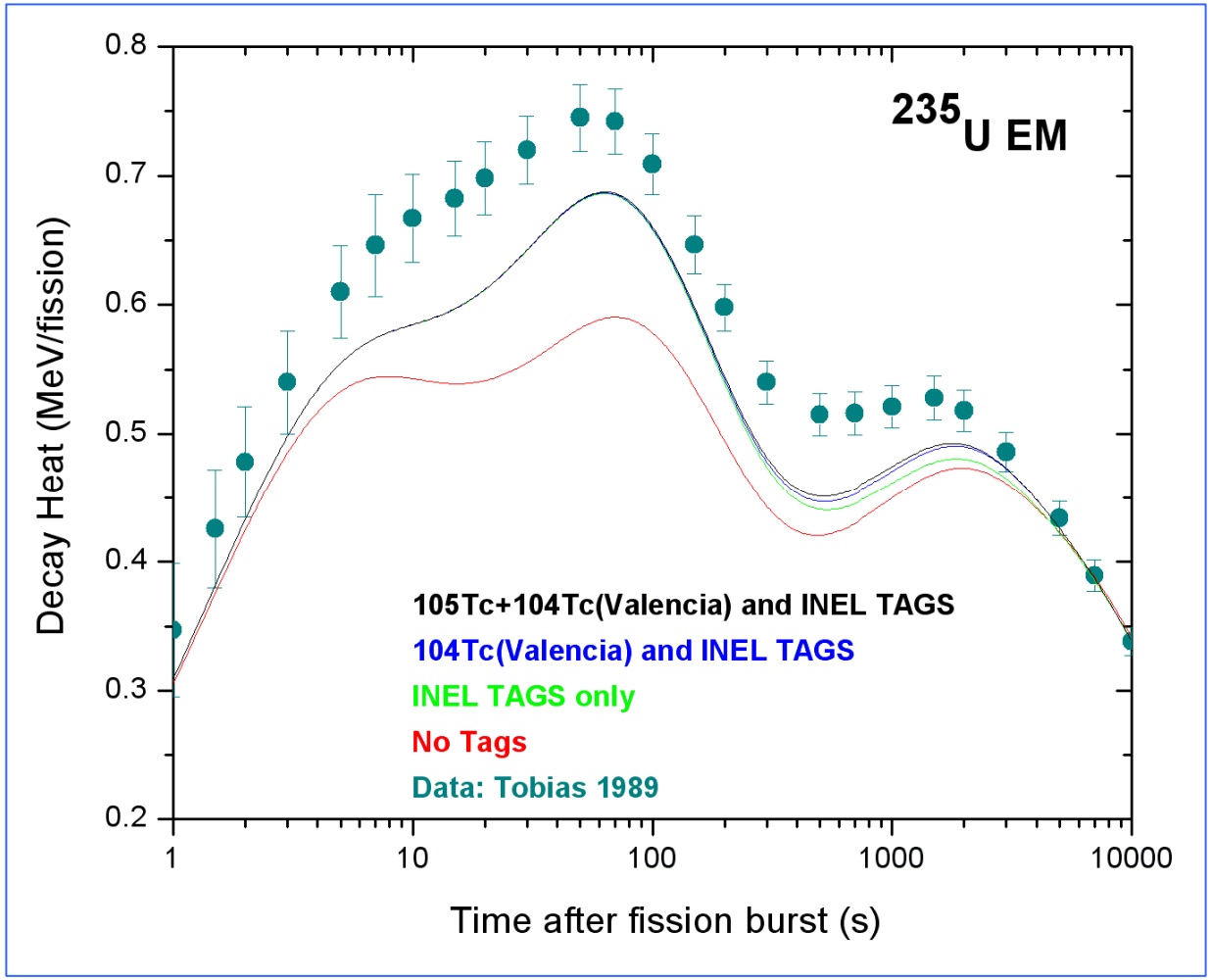


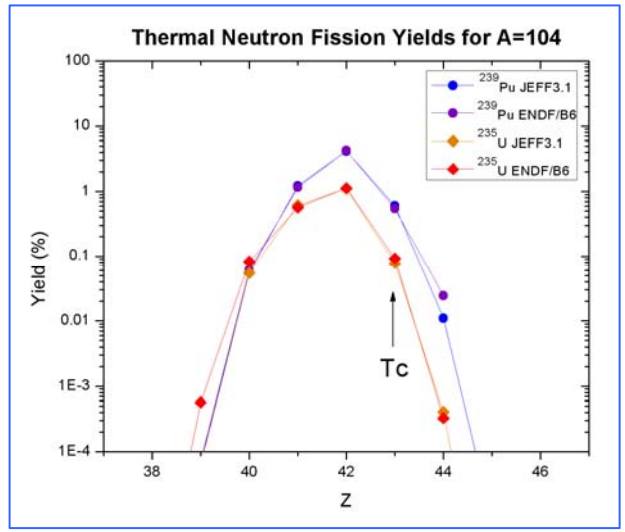
^{239}Pu Decay Heat Calculations

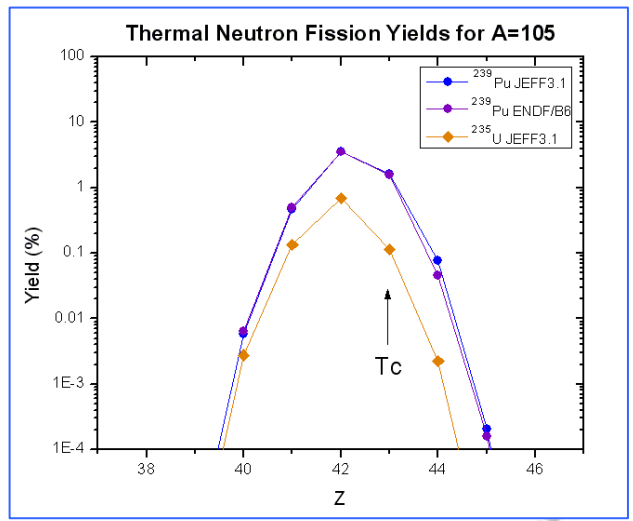
Effect of new TAGS data



^{235}U Decay Heat Calculations







Summary

- ENDF/B-VII decay data library part of beta 2 release, update will be part of beta 3.
- Sensitivity study to obtain list of priority nuclides
- Close interaction with members of WPEC Subgroup 25 (beta decay and decay heat)

Future

- Decay Heat calculations for fast energies and other actinides
- Review minor actinides decay evaluations
- Close collaboration with experimental groups performing TAGS measurements