

Case of graphite reflector (9.94 cm Am-241 radius and graphite in outward region up to 30 cm radius).

Calculation:SCALE6.2beta3. ENDF/B-VII.0 238 groups.

COVARIANCE nuclear data based on SCALE6.1 (for Am241(n,n') from ENDF/B-VI.8)

example 1d 238groupndf5 - keff	
Summary of Transport Solution	
number of neutron groups:	238
number of gamma groups:	0
number of regions:	2
maximum mixture number:	2
number of mixing table entries:	2
quadrature order of angular fluxes:	32
maximum order of flux moments:	5
Forward Calculation: k-eff =	1.02737997
Adjoint Calculation: k-eff =	1.02735876

Uncertainty Information

The relative standard deviation of k_{eff} (% $\Delta k/k$) due to cross-section covariance data is: 7.7518 % $\Delta k/k$
 contributions to uncertainty in k_{eff} (% $\Delta k/k$) by individual energy covariance matrices:

Covariance Matrix		Contributions to Uncertainty in k_{eff} (% $\Delta k/k$)
Nuclide-Reaction	Nuclide-Reaction	Due to this Matrix
²⁴¹ Am n,n'	²⁴¹ Am n,n'	7.0520E+00
²⁴¹ Am elastic	²⁴¹ Am n,n'	2.5738E+00
²⁴¹ Am fission	²⁴¹ Am fission	1.8566E+00
²⁴¹ Am elastic	²⁴¹ Am elastic	5.2122E-01
²⁴¹ Am n,gamma	²⁴¹ Am n,gamma	3.5005E-01
²⁴¹ Am elastic	²⁴¹ Am fission	-3.3469E-01
C elastic	C elastic	6.6400E-02
²⁴¹ Am elastic	²⁴¹ Am n,gamma	4.2602E-02
²⁴¹ Am n,2n	²⁴¹ Am n,2n	2.8737E-02
²⁴¹ Am elastic	²⁴¹ Am n,2n	8.0554E-03
C n,n'	C elastic	-7.6890E-03
C n,n'	C n,n'	6.6246E-03
C n,n'	C n,alpha	1.5827E-03
C n,alpha	C n,alpha	7.7964E-04
²⁴¹ Am fission	²⁴¹ Am n,gamma	-7.7425E-05
²⁴¹ Am nubar	²⁴¹ Am nubar	4.9416E-05
C n,gamma	C n,gamma	2.1170E-05
C n,n'	C n,gamma	7.8852E-06
C n,n'	C n,d	1.1848E-06
C n,d	C n,d	5.7480E-07
C n,n'	C n,p	5.4099E-07
C n,p	C n,p	2.7322E-07

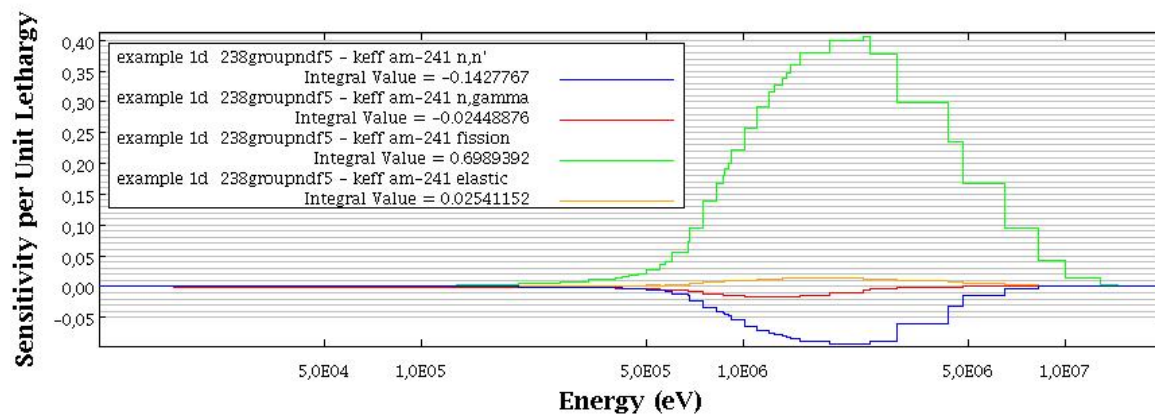


Figure 1. Sensitivity coefficients calculated with TSUNAMI

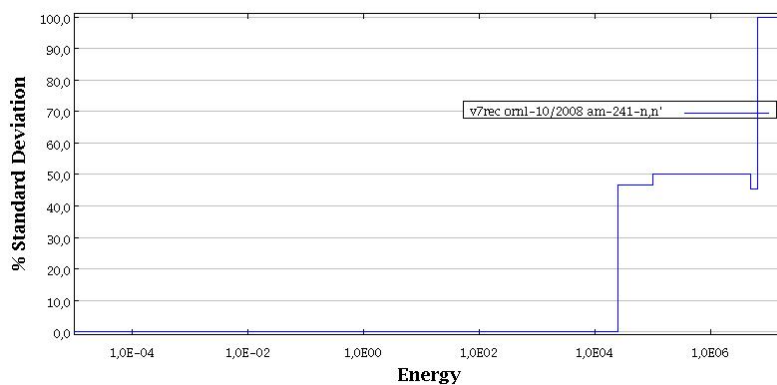


Figure 2. Standard deviation (%) for Am241(n,n') taken from SCALE6.1/6.2beta3

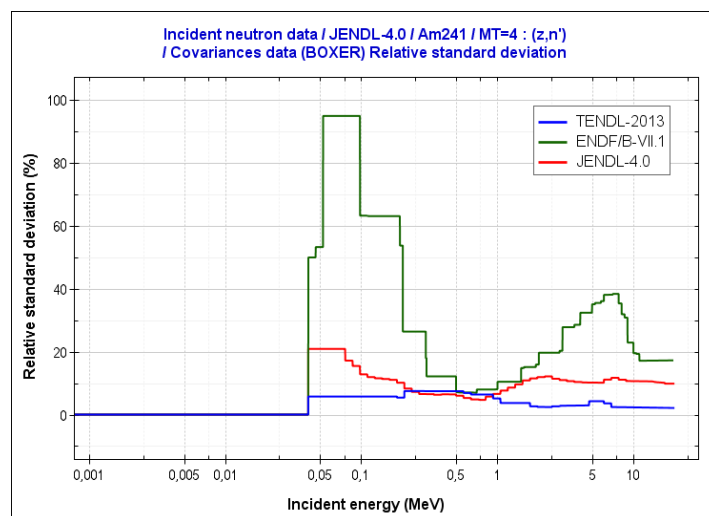


Figure 3. Standard deviation (%) for Am241(n,n') taken from TENDL2013, ENDF/B-VII.1 and JENDL-4.0

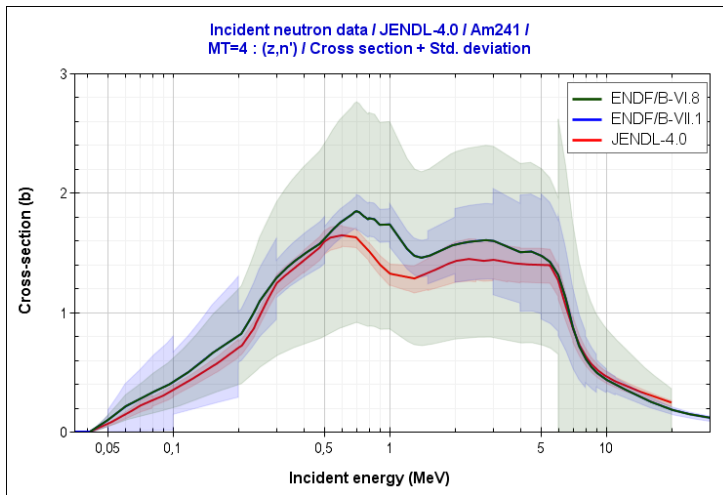


Figure 4. Cross-sections and standard deviation for Am241(n,n').

- Uncertainties for Am241(n,n') in SCALE6.2beta3 are taken from ENDF/B-VI.8.
- ENDF/B-VI.8 and ENDF/B-VII.1 have the same mean value.

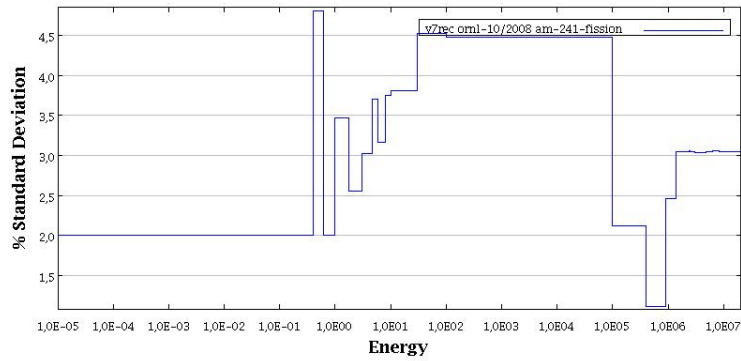


Figure 5. Standard deviation (%) for Am241(n,fission) taken from SCALE6.1/6.2beta3

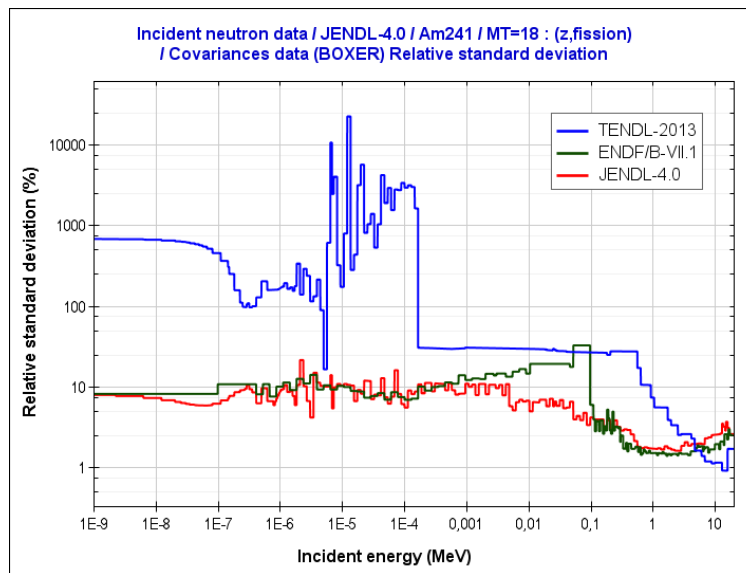


Figure 6. Standard deviation (%) for Am241(n,fission) taken from TENDL2013, ENDF/B-VII.1 and JENDL-4.0

INPUT SCALE

```
=tsunami-1d parm=(centrm)
Example 1D
v7-238
read composition
  am-241 1 den=13.00487 1.0 300.0 end
  carbon 2 den= 1.7      1.0 300.0 end
end composition
read celldata
  multiregion spherical left_bdy=reflected right_bdy=vacuum end
  1 9.94
  2 30.0
end zone
end celldata
read parameter
  isn=32
end parameter
read geometry
  spherical vacuum reflected end
  1 9.94
  2 30.0
end geometry
read sams
  prtgeom
  prtimp
end sams
end
```