



IAEA

60 Years

Atoms for Peace and Development

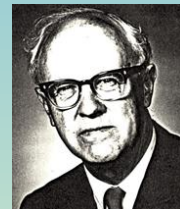
Thermal Neutron Constants for ^{233}U , ^{235}U , ^{239}Pu , ^{241}Pu and the ν_{tot} of $^{252}\text{Cf}(\text{sf})$

V.G. Pronyaev, R. Capote, A. Trkov, G. Noguere, A. Wallner

Deputy Section Head, Nuclear Data Section
International Atomic Energy Agency
Department for Nuclear Sciences and Applications

ND-2016, Bruges, Belgium, September 11-16 2016

2200 m/s and 20°C Maxwellian neutron data: Thermal Constants



- [1] **WESTCOTT, C. H.** et al, Atomic Energy Review **3** (1965) 3
- [2] **HANNA, G. C., WESTCOTT, C. H., LEMMEL, H. D.** et al, Atomic Energy Review **4** (1969) 3, also **INDC(NDU)-012**
- [3] **LEMMEL, H. D.** et al, Proc. Conf. Nucl. Cross Sect. & Tech., Wash. DC, 3-7 March 1975, *NBS Spec. Publ.* **425**, 286 (1975), also **INDC(NDS)-132**
- [4] **LEMMEL, H. D.** et al, Proc. Spec. Symp. Neutron Standards & Applications, *NBS Spec. Publ.* **493**, 170 (1977); IAEA Technical Reports Series **227** (1983), p.71
- [5] **STEHN, J. R., DIVADEENAM, M.** and **HOLDEN, N. E.**, Conf. NDST, Antwerp, 1982, Proc. edited by K.H. Boeckhoff (1983) p. 685.
- [6] **DIVADEENAM, M.** and **STEHN, J. R.**, *Ann. Nucl. Energy* **11** (1984) 375-404
- [7] **AXTON, E. J.**, Geel Report GE/PH/01/86
- [8] **PRONYAEV, V. G., CARLSON, A.** et al., 2004-2016

PFNS $\langle E_n \rangle$ used in all fits above 2.03MeV (e.g., [6])

Evolution of Thermal Constants 1975-...

1) Lemmel 1975

	Micr+macr.	Micr. only
$\sigma(n,f)$	583.5 ± 1.3	587.7 ± 1.9
$\sigma(n,\gamma)$	97.4 ± 1.6	93 ± 2
$v(\text{tot})$	$2.416(5)$	$2.387(6)$



Mic-mac discrepancy noted

Axton 1986

	Micr+macr.	Micr. only
$\sigma(n,f)$	582.8 ± 1.2	585.1 ± 1.6
$\sigma(n,\gamma)$	99.1 ± 0.7	96.1 ± 1.7
$v(\text{tot})$	$2.4334(36)$	$2.4261(46)$
K1	718.6	721.24

Pronyaev et al, GMA 2004

	Micr+macr.	ENDF/B-VI
$\sigma(n,f)$	584.3 ± 1.1	584.88
$\sigma(n,\gamma)$	99.4 ± 0.7	98.66
$v(\text{tot})$	$2.4358(4)$	2.4367(5)
K1	719.67	722.7

IAEA Thermal constants 2016 (final)

TNC	2200m/s & Maxwell. IAEA 2006		2200m/s + IAEA 08/2016	IAEA CIELO g-factors
SF-U5	584.3±1.0	◀	587.2±1.4	0.9793
SG-U5	99.4±0.7		99.3±2.0	0.9921
NU-U5	2.4355±0.23	▶	2.4250±0.0045	(from RRR)
K1(*)	721.35		720.9	
K1 Hardy	722.7±3.9		722.7±3.9	
K1 Noguere	720±3		720±3	
SF-PU9	750±1.8	◀	752.1±2.2	1.0516
SG-PU9	271.5±2.1		270.4±3.1	1.1474
NU-PU9	2.8836±0.0047	▶	2.8775±0.0060	(from RRR)
K1(*)			1174.5	
K1 Noguere	1176±6		1176±6	