

Energy coding for Spectrum Average

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(1) The relation $E(\text{mean}) = 3/2 kT$ is correct:

If a neutron has the energy kT , its velocity $\sqrt{2kT/m}$ is at the maximum of velocity distribution equilibrated to a temperature T .

If a neutron has the energy $(3/2)kT$, its velocity $(2kT/m)$ gives the r.m.s. velocity. Namely, mean neutron energy in this system is $\langle E \rangle = (1/2)m\langle v^2 \rangle = (3/2) kT$.

For neutrons equilibrated in thermal reactors,
 $kT=0.0253$ eV, $\langle E \rangle = (3/2)kT=0.0380$ eV
 For neutrons equilibrated in typical stellar,
 $kT=30$ keV, $\langle E \rangle = 45$ keV.

Therefore physically both coding ways are correct.
 $KT=30\text{KEV}$ or $EN\text{-}MEAN=45\text{KEV}$.
 (I know Stas did this coding sometimes.)

(2) But it is inconvenient to have such variety in EXFOR. I prefer to use KT rather than $EN\text{-}MEAN$ for such cases, and I always recommend to use $KT=30\text{KEV}$ rather than $EN\text{-}MEAN=45\text{KEV}$.

A possible action might be as follows:

"Code kT value under KT rather than $(3/2)kT$ under $EN\text{-}MEAN$ if authors characterize the neutron spectrum by kT "