

Data Compilation for Neutron Library (SLIB2)

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High-energy Extension

- Data sources ($E > 20$ MeV)

JENDL/HE TENDL

- Our task

Merge with lower-energy data

High-energy Extension with JENDL/HE

- ENDF/B-VII.0 +

^1H , ^{19}F , $^{35,37}\text{Cl}$, $^{39,41}\text{K}$, ^{59}Co , ^{197}Au , $^{235,238}\text{U}$

- JENDL-4.0 +

^{12}C , ^{14}N , ^{23}Na , $^{24,25,26}\text{Mg}$, $^{40,42,43,44,46,48}\text{Ca}$, $^{46,47,48,49,50}\text{Ti}$,
 ^{51}V , ^{55}Mn (IAEA?), $^{69,71}\text{Ga}$, $^{90,91,92,94,96}\text{Zr}$, ^{93}Nb ,
 $^{92,94,95,96,97,98,100}\text{Mo}$, ^{181}Ta , $^{36,38,40}\text{Ar}$, $^{64,66,67,68,70}\text{Zn}$

Submitted to IAEA-NDS in January, 2011

High-energy Extension with TENDL

○ ENDF/B-VII.0 +

${}^6,7\text{Li}$, ${}^9\text{Be}$, ${}^{10,11}\text{B}$, ${}^{32,33,34,36}\text{S}$, ${}^{40}\text{K}$, ${}^{89}\text{Y}$, ${}^{107,109}\text{Ag}$,
 ${}^{106,108,110,111,112,113,114,116}\text{Cd}$, ${}^{121,123}\text{Sb}$, ${}^{136,138,140,142}\text{Ce}$,
 ${}^{130,132,134,135,136,137,138}\text{Ba}$, ${}^{162,164,166,167,168,170}\text{Er}$

○ JENDL-4.0 +

${}^{50}\text{V}$, ${}^{112,114,115,116,117,118,119,120,122,124}\text{Sn}$, ${}^{79,81}\text{Br}$, ${}^{133}\text{Cs}$,
 ${}^{152,154,155,156,157,158,160}\text{Gd}$, ${}^{174,176,177,178,179,180}\text{Hf}$

○ JEFF-3.1.1 + ${}^{103}\text{Rh}$, ${}^{127}\text{I}$

○ RUSFOND-2010 + ${}^{15}\text{N}$

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High-energy Extension (no Actions)

- ENDF/B-VII.0
 ^{16}O , $^{28,29,30}\text{Si}$, $^{54,57}\text{Fe}$, $^{62,64}\text{Ni}$, $^{63,65}\text{Cu}$
- JEFF-3.1.1
 ^{27}Al , $^{28,29,30}\text{Si}$, $^{50,52,53,54}\text{Cr}(?)$, $^{56,58}\text{Fe}$, $^{58,60}\text{Ni}$,
 $^{204,206,207,208}\text{Pb}$, ^{209}Bi , ^{45}Sc , $^{70,72,73,74,76}\text{Ge}$
- TENDL-2010
 ^{13}C , $^{17,18}\text{O}$, ^{31}P , $^{138,139}\text{La}$, $^{175,176}\text{Lu}$, $^{185,187}\text{Re}$,
 $^{190,192,194,195,196,198}\text{Pt}$
- IAEA
 $^{180,182,183,184}\text{W}$, $^{55}\text{Mn}(?)$

JENDL/HE

- JENDL-4 was adopted for $E < 20$ MeV
- JENDL/HE-2007 was used for $E > 20$ MeV
- High-energy cut was done @150 MeV
- MT=208,209,210 were removed
- For proton library, we are ready to do so

TENDL-2010

- TENDL-2010 was used for $E > 20$ MeV
- 20 MeV sharp-cut version (MT=5)
- “150 MeV Cut” was not performed, because of rather rough energy grid and INT=2 in MF=6

$^{235,238}\text{U}$ Fission Neutron Spectrum Data

- ENDF/B-VII.0 ($E < 20/30$ MeV)
(MF,MT) = (4,18) & (5,18) \longrightarrow (6,18)
- JENDL/HE ($E > 20/30$ MeV)
(MF,MT) = (6,18)

File Check

- CHECKR-8.05 & FIZCON-8.03
(latest versions in January, 2011)
- Same warnings in original files
- No serious problems,
except for I-127 (JEFF-3.1.1+)
Too many warnings/errors

Gd & Hf

Nuc	Data Sources	Task	Action
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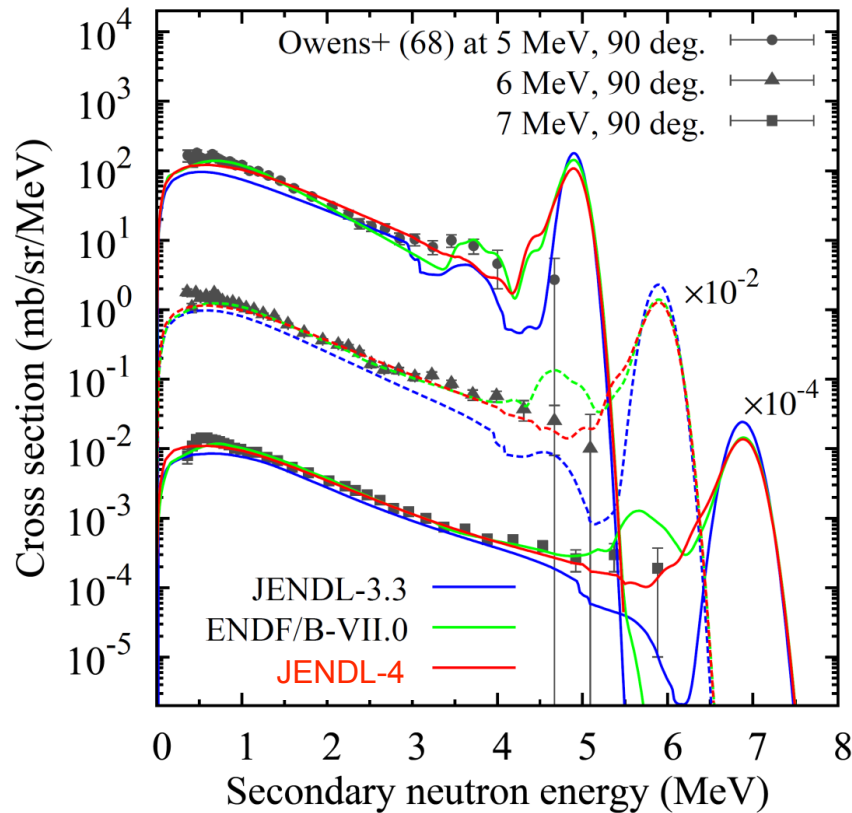
Gd-152	JEFF-3.2 or JENDL-4	TENDL	S.Kunieda to compare with JENDL-4	JEFF-3.2 has not been released. JEFF-3.1.1 : JENDL-3.3. Adopt JENDL-4 (new in-depth evaluation)
-154				
-155				
-156				
-157				
-158				
-160				

Hf-174	ENDF/B- VII or JENDL-4	TENDL	S.Kunieda to compare with JENDL-4	JENDL-4 was used below 20 MeV (new RPs, CC, POD evaluation).
-176				
-177				
-178				
-179				
-180				

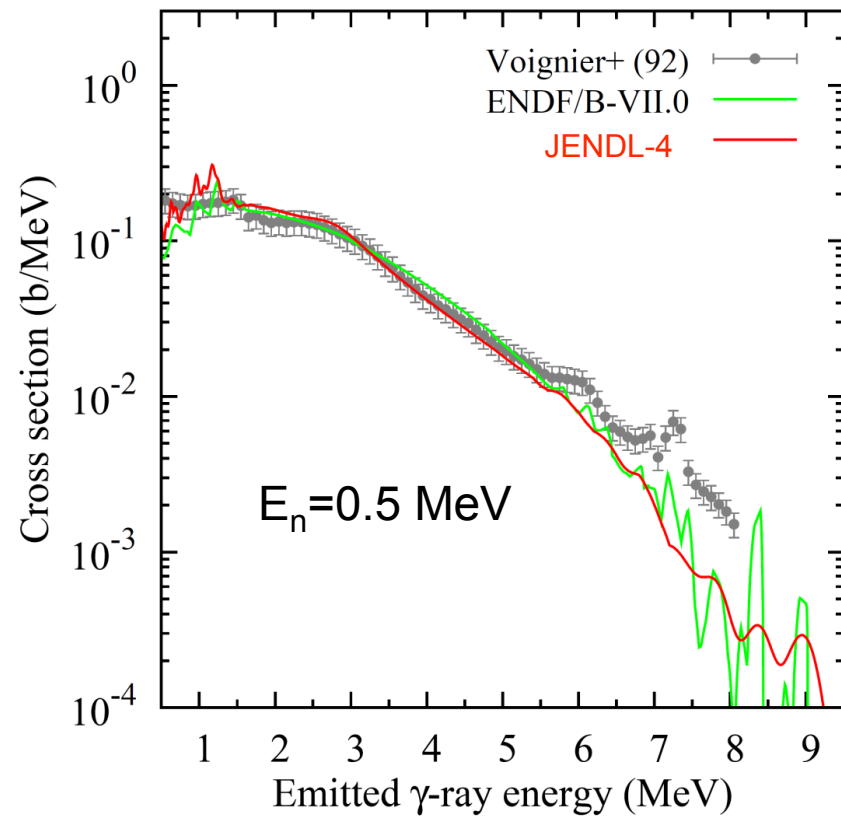
see J. Nucl. Sci. & Technol. Vol. 47, 160 (2010).

Gd Examples

Gd(n,xn) spectra

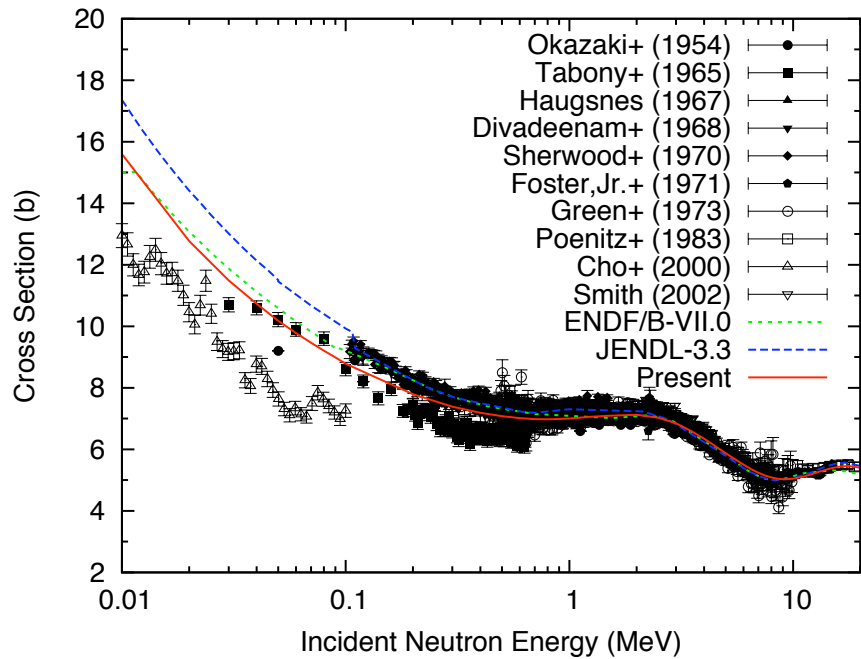


Gd γ -ray spectra

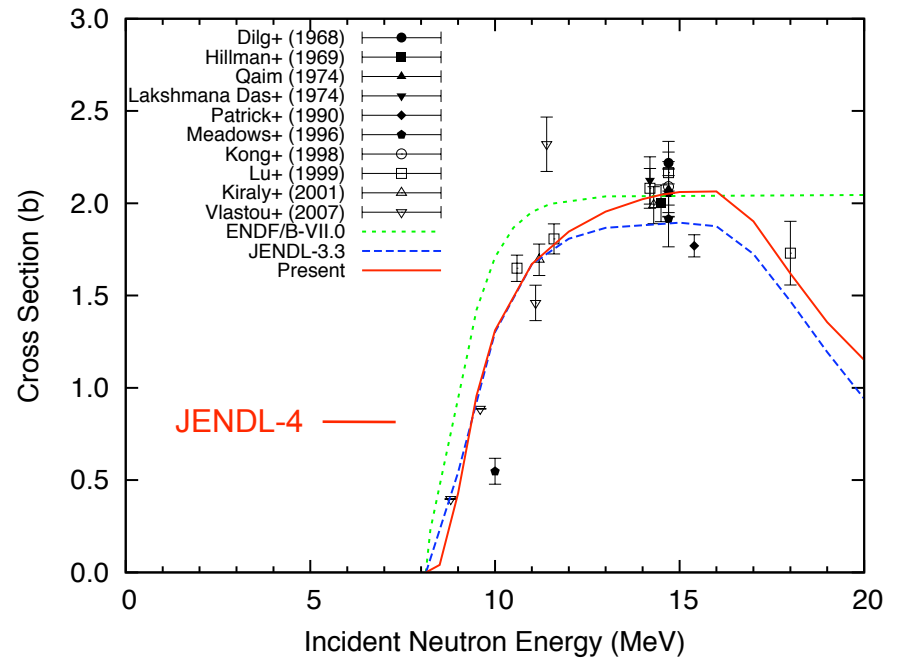


Hf Examples

Hf Total



$^{176}\text{Hf}(n,2n)^{175}\text{Hf}$



Thank You !