Status of SG31

Meeting Nuclear Data Needs for Advanced Reactor Systems

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SG-31 Activities

→ Comparison of accuracy (%) estimation between SG-26, JENDL-4.0, ENDF/B-VII.1. I*, JEFF-3.1.2, and BROND-3

→ Update of APPENDIX (Graphical presentation of EXFOR data)

→ New Contributions

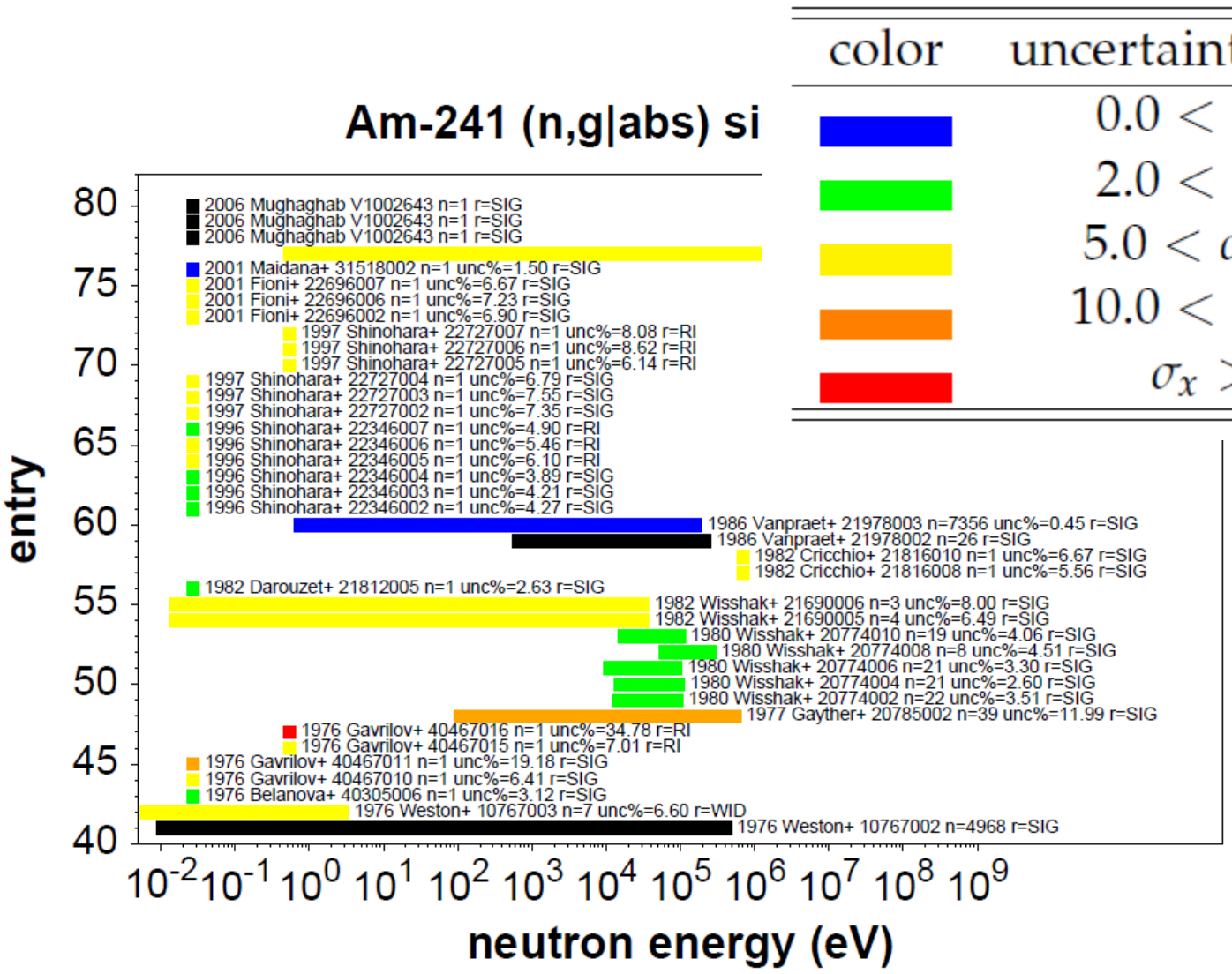
→ Near Final Report

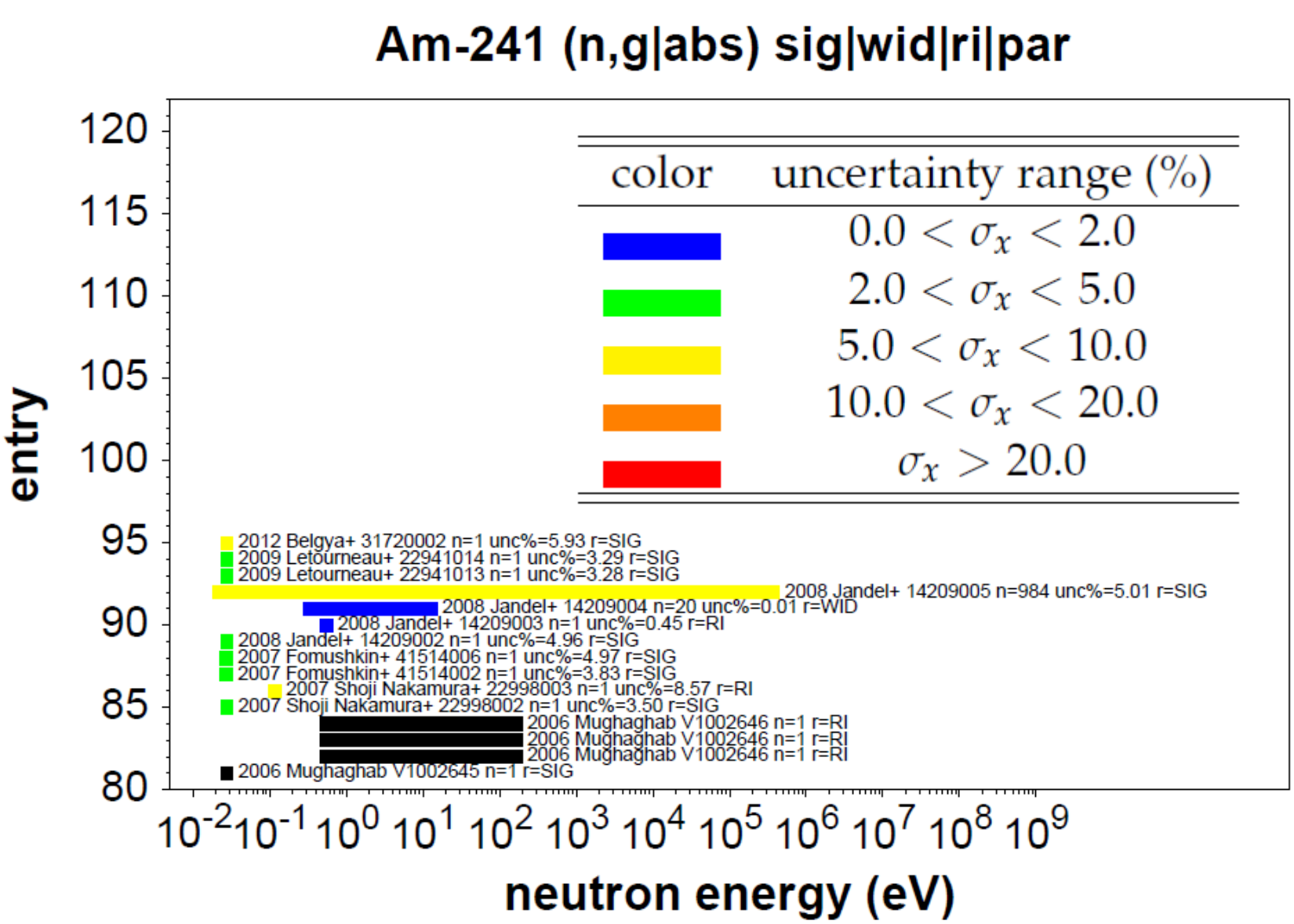
Comparison of accuracy (%) estimation between SG-26, JENDL-4.0, ENDF/B-VII.1. I*, JEFF-3.1.2, and BROND-3

Nuclide	Quantity	Energy range	SG-26	JENDL-4	ENDF/B-VII.1	JEFF-3.1.2	BROND-3 GMA	BROND-3 SYS
Na-23	inel	0.498 - 2.23 MeV	25	17 - 20	8 - 16			7 - 8
Si-28	inel	1.35 - 6.07 MeV	14 - 50		2 - 4	~ 5		
Si-28	capt	6.07 - 19.6 MeV MeV	53			~ 35		
Fe-56	inel	0.498 - 2.23 MeV	16 - 25	15 - 17	7 - 12	~ 2	2	5
Pb-206	inel	1.35 - 2.23 MeV	14		8			10
Pb-207	inel	0.498 - 2.23 MeV	11		9 - 17			10
U-238	inel	0.498 - 6.07 MeV	10 - 20	5 - 11	12 - 21			7
U-238	capt	2.03 - 24.8 keV	3 - 9	7 - 10	3		0.9 – 2.2	7
Pu-238	fiss	0.183 - 1.35 MeV	20	2.4 – 3.0	1.0 – 1.2			
Pu-239	capt	2.03 - 498 keV	7 - 15	5 - 9	7 - 15			4
Pu-240	fiss	0.498 - 1.35 MeV	6	0.8	0.9			1.4
Pu-240	n	0.498 - 1.35 MeV	4	0.2	0.4			0.7
Pu-241	fiss	454 eV -1.35 MeV	8 - 20	0.8 - 5				4
Pu-242	fiss	0.498 - 2.23 MeV	19 – 21	2				
Am-241	fiss	2.23 - 6.07 MeV	12	1.4	1.3			1.5
Am-242m	fiss	67.4 keV -1.35 MeV	17	3	1.5			
Cm-244	fiss	0.498 - 1.35 MeV	50	4	3			3 – 7
Cm-245	fiss	67.4 - 183 keV	47	5	4			3

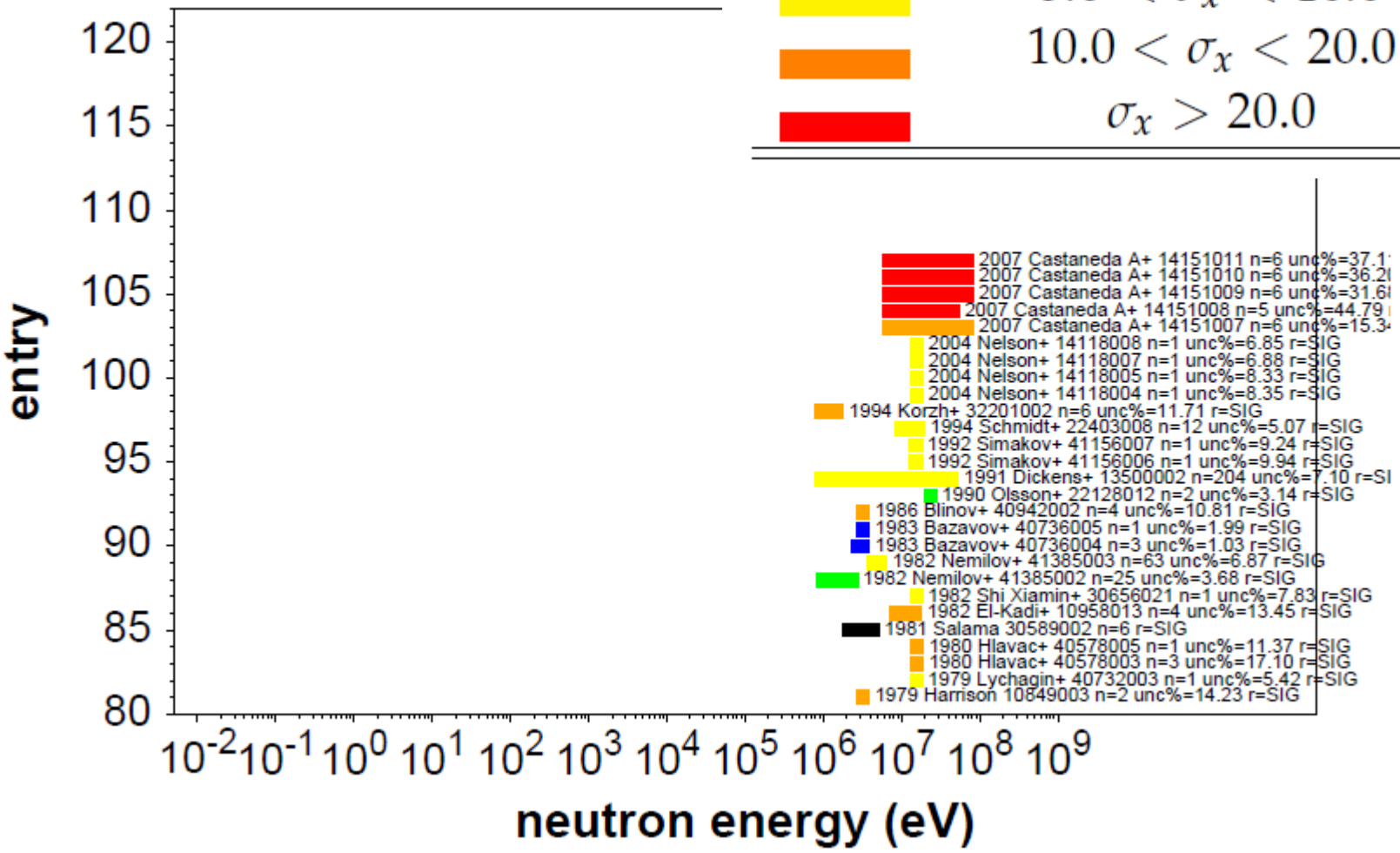
Update of APPENDIX (Graphical presentation of EXFOR data)

color	uncertainty range (%)
	$0.0 < \sigma_x < 2.0$
	$2.0 < \sigma_x < 5.0$
	$5.0 < \sigma_x < 10.0$
	$10.0 < \sigma_x < 20.0$
	$\sigma_x > 20.0$




Am-241 (n,g|abs) sig|wid|ri|par
color
uncertainty range (%)
$0.0 < \sigma_x < 2.0$
$2.0 < \sigma_x < 5.0$
$5.0 < \sigma_x < 10.0$
$10.0 < \sigma_x < 20.0$
$\sigma_x > 20.0$
2012 Belgya+ 31720002 n=1 unc%=5.93 r=SIG
2009 Letourneau+ 22941014 n=1 unc%=3.29 r=SIG
2009 Letourneau+ 22941013 n=1 unc%=3.28 r=SIG
2008 Jandel+ 14209005 n=984 unc%=5.01 r=SIG
2008 Jandel+ 14209004 n=20 unc%=0.01 r=WID
2008 Jandel+ 14209003 n=1 unc%=0.45 r=RI
2008 Jandel+ 14209002 n=1 unc%=4.96 r=SIG
2007 Fomushkin+ 41514006 n=1 unc%=4.97 r=SIG
2007 Fomushkin+ 41514002 n=1 unc%=3.83 r=SIG
2007 Shoji Nakamura+ 22998003 n=1 unc%=8.57 r=RI
2007 Shoji Nakamura+ 22998002 n=1 unc%=3.50 r=SIG
2006 Mughaghab V1002646 n=1 r=RI
2006 Mughaghab V1002646 n=1 r=RI
2006 Mughaghab V1002646 n=1 r=RI
2006 Mughaghab V1002645 n=1 r=SIG
entry
120
115
110
105
100
95
90
85
80
10^{-2} 10^{-1} 10^{0} 10^{1} 10^{2} 10^{3} 10^{4} 10^{5} 10^{6} 10^{7} 10^{8} 10^{9}
neutron energy (eV)

color	uncertainty range (%)
	$0.0 < \sigma_x < 2.0$
	$2.0 < \sigma_x < 5.0$
	$5.0 < \sigma_x < 10.0$
	$10.0 < \sigma_x < 20.0$
	$\sigma_x > 20.0$



Contents of a (Near) Final Report

4. RECOMMENDATION OF COLLABORATIVE PATH FORWARD TO MEET THE NEEDS

It is recommended to proceed independent measurements, for examples, using different measurement principles, facilities, detectors, samples, experimenters, which may affect the experimental values. Especially, combined use of differential and integral measurements is recommended to achieve the target accuracy.

The comprehensive and unified guides are desired to be prepared for each experimental method, which describe the details of the data reduction and uncertainty evaluation.

4. RECOMMENDATION OF COLLABORATIVE PATH FORWARD TO MEET THE NEEDS

the collective knowledge of the recognized systematic effect should be summarized as a series of research reports.

To guarantee independence of experiments, international collaborations are indispensable, …. In order to demonstrate the effectiveness of such collaborations, an appropriate framework should be established, where serious scientific discussions are possible.

Nuclear data together with their uncertainties should be revised periodically by an appropriate international committee, such as the Committee on Data for Science and Technology (CODATA) in the field of fundamental physical constants.

5. SUMMARY

To meet the requirement of accurate nuclear data for developing advanced nuclear systems, pertinent efforts of experiments and evaluations are still required and indispensable.

There are striking technical advancements in nuclear data measurement methods. By utilizing these state-of-art techniques, further improvements of nuclear data accuracy are expected.

In order to obtain an accurate nuclear data, it is important to measure nuclear data precisely and identify the unrecognized systematic effects as much as possible. The double check experiments are indispensable to verify the results. To guarantee independence of experiments, international collaborations are effective. In order to demonstrate the effectiveness of such collaboration, an appropriate framework should be established, where serious and detailed scientific discussions are possible.