Summary ^{1}H, ^{16}O, ^{56}Fe

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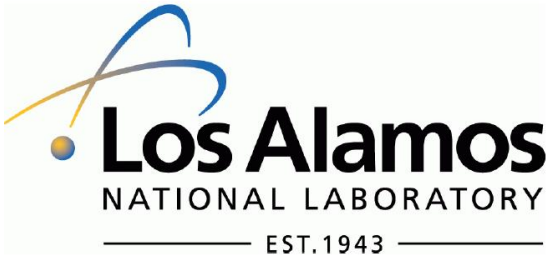

^{1}H (Hale)

European Commission

1. Proceeds under the heading of standards but will have deliverables aimed at inclusion in CIELO.

2. High level of accuracy achieved already.

3. Add new data to N-N analysis (including n-p capture and d-photo-disintegration data), increasing the energy range by ~ 50 MeV steps, until we have reached at least 200 MeV. Target date for completion is October 2014.

4. Need to understand the magnitude and energy variation of the uncertainties.

European Commission

Benchmarks and sensitivity

- Set of identified benchmarks (Romano); others?
- Sensitivity to -3% total cross section section shown
  To do (Romano):
  sensitivity to (n,a) +/-50% ?
  sensitivity to total xs E-dep.
  below 100 keV and above 100 keV
- Statistical significance of trend should be studied (Ivanova).
- Thermal scattering
  Important but we have no experts.
  Can we at least analyze sensitivity?
  (Roubtsov?).

European Commission

Low energy data

1. We need to fix the final number to adopt for the evaluation (Kopecky, Plompen).

2. Oxygen is always a difference measurement (Si – SiO2, Al – Al2O3, Be – BeO, H2O-D2O-CH2-C). Numbers for Si, Al, Be, H, D, C need to be used so we need a consistent **set**. Cross check on Koester, Sears, Rauch compilations (Kopecky, Plompen).

European Commission

Total cross section

- All data have consistent energy dependence (Lubitz)
- Normalization of Sayer 2000 to Cierjacks ’80 shows consistency with the accurate four low energy data with few motivated corrections (Lubitz, Kunieda)
- Resonance analysis: full accounting of resolution functions and of transmission to reduce sensitivity to peaks remains to be done and should be done to see how they affect the widths. (Hale, Kunieda, Leal, Moxon)
- Resonance analysis: should ‘force’ agreement with the low energy scattering cross section: 3.761-3.795 b. Tentatively: 3.778(17) b (uncertainty 0.45%). (Hale, Kunieda, Leal, Moxon)

European Commission

The $^{16}O(n,a)$ and $^{13}C(a,n)$ cross sections

- Obtain the final $^{16}O(n,a)$ data from the IPPE (IRMM) experimental work with a description how to compare this to evaluations and high resolution sets (Khryatchkov).
- Encourage nTOF community to measure $^{16}O(n,a)$ by TOF (Khryatchkov/IPPE) proposal. Run in 2014!
- Detailed discussion Plompen-Khryatchkov to better understand the experiment.
- Obtain a description and the values of the Pronyaev evaluation.

The $^{16}O(n,a)$ and $^{13}C(a,n)$ cross sections

- Discuss with authors Harissopulos et al. to clarify their data set; get it without resolution correction; get thick target yields (Plompen)
- Produce a best result out of the available 13C(a,n) data correct for angular distribution if possible (Plompen).
- Check the above $^{13}C(a,n)$ for consistency with IPPE $^{16}O(n,a)$
- Ask Leal to include this in the Sayer evaluation and report the normalization factor (same Hale, Kunieda if the changes from total cross section analysis warrant it).
  What additional modeling freedom is there? More resonances than meet the eye?
- Further experimental confirmation $^{13}C(a,n)$? Seems useful.

Elastic scattering angular distributions

New angular distribution measurements (or benchmark data such as those done at RPI) would be useful to verify an indication for a large increase in P1.
The latter could counter act a trend in light water benchmarks due to a 3% reduction in total cross section.

^{56}Fe

European Commission

- Important new benchmark data on scattering cross section RPI. Useful for checking evaluations. May become more exclusive in terms of scattering channels (Danon).
- How to handle fluctuations of total, inelastic for the other channels and the inelastic channels? What about angular distributions in this range below 2(4) MeV (Herman, Danon).
- Considerable number of entries in Exfor that need sorting and commenting to facilitate new evaluations (Brown).
- New RRR evaluation up to 2 MeV including IRMM, ORNL inelastic and ORNL total cross sections (Leal).
- Do we need an URR range from 2-4 MeV? Check literature: Froehner, Gruppelaar/Koning/Hogenbirk, Reffo (Danon,Plompen).

^{56}Fe

- Sensitivity analysis in progress to identify sensitive benchmarks; 38 ICSBEP cases plus 10-12 proprietary (Ivanov/Ivanova). Link with SG-33, 39.
- Sensitivity analysis shows importance for void and Doppler coefficients of SFR (Herman).

- Often data are available for ^{nat}Fe (2 more important isotopes). The material in use is ^{nat}Fe. How well do we need to do on ^{54,57,58}Fe? (Brown, Trkov, Herman).

- Lack of experimental data for ^{56}Fe (Herman, Iwamoto). In contrast certain resonances are used as standards for capture normalization. This point needs clarification (Schillebeeckx?).

- Good data available for ^{56}Fe(n,p); it is a dosimetry standard (Herman, Iwamoto).

^{56}Fe

- New OMP available for fast energy region that should also deliver the URR average and match with RRR of Leal (Capote, Herman, Leal).
- New microscopic LD evaluations (Alhassid, Herman)
- There are considerable issues with angular distributions for elastic scattering (Herman, Iwamoto)
- Inelastic level cross sections in the Pre-equilibrium Range differ widely between evaluations. In addition guidance seems needed to know how to handle gamma-emission data (Herman, Brown).
- $^{56}Fe(n,a)^{53}Cr$ needs improved data and/or handling in evaluation (Wallner?).
- $^{56}Fe(n,2n)$ needs (better) data above 15 MeV (Wallner).

- Herman proposed a program of work for the contributors.

Modus operandi: split into sub^3-groups

- analysis of experimental data
  - total
  - inelastic
  - spectra…
  - experimental covariances
- level densities
- soft-rotor CC potential
- fluctuations
- angular distributions

- fast neutron modeling
- file assembly
- verification & validation
- (consistent) adjustment
- covariances