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Compilation of Nuclear Data Experiments for Radiation Characterisation (CoNDERC)

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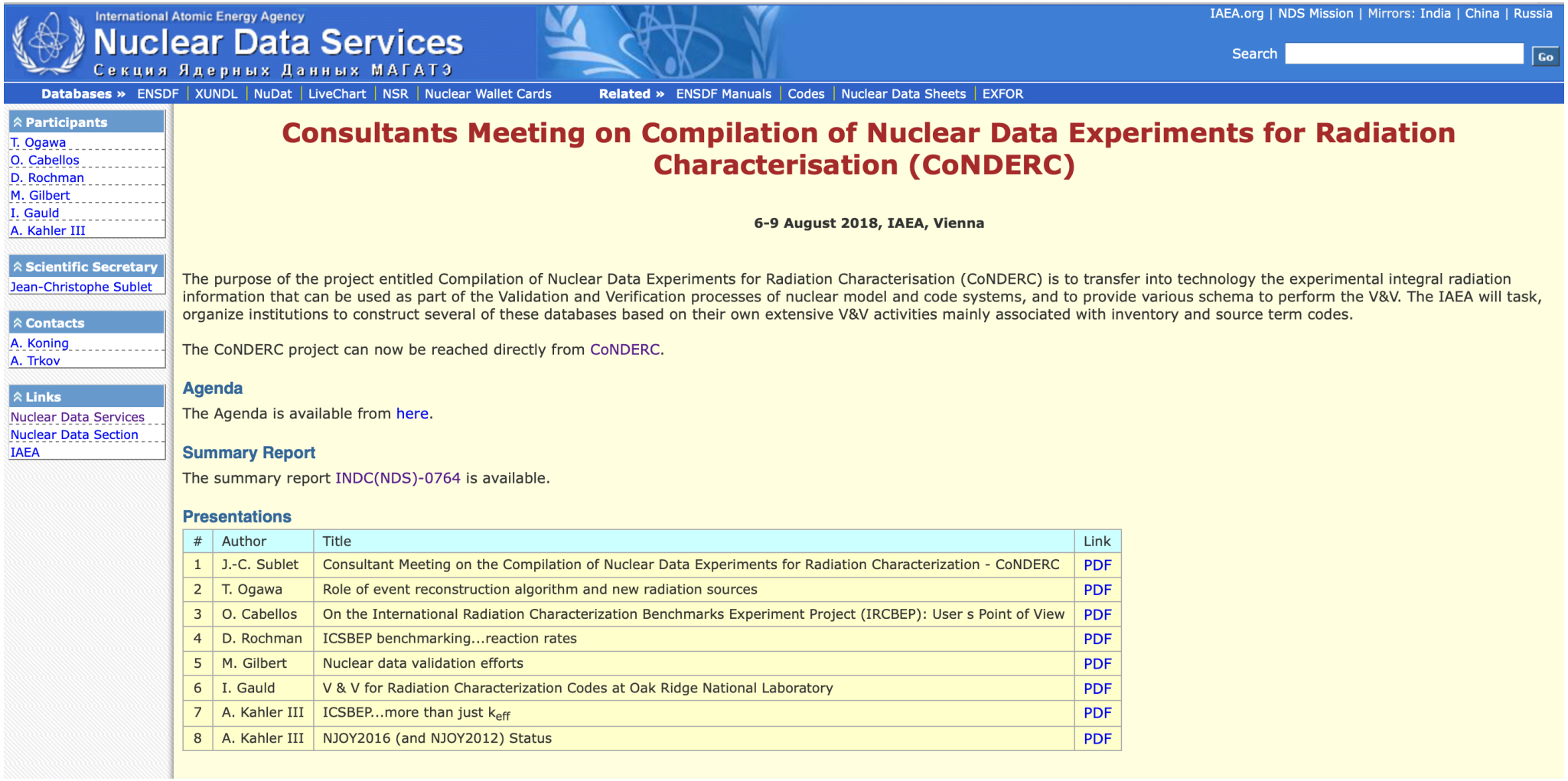
Background

- The Compilation of Nuclear Data Experiments for Radiation Characterisation (CoNDERC) project found its root in a small Consultant Meeting



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D. Rochman
M. Gilbert
I. Gauld
A. Kahler III

Scientific Secretary
Jean-Christophe Sublet

Contacts
A. Koning
A. Trkov

Links
Nuclear Data Services
Nuclear Data Section
IAEA

Consultants Meeting on Compilation of Nuclear Data Experiments for Radiation Characterisation (CoNDERC)

6-9 August 2018, IAEA, Vienna

The purpose of the project entitled Compilation of Nuclear Data Experiments for Radiation Characterisation (CoNDERC) is to transfer into technology the experimental integral radiation information that can be used as part of the Validation and Verification processes of nuclear model and code systems, and to provide various schema to perform the V&V. The IAEA will task, organize institutions to construct several of these databases based on their own extensive V&V activities mainly associated with inventory and source term codes.

The CoNDERC project can now be reached directly from CoNDERC.

Agenda

The Agenda is available from here.

Summary Report

The summary report INDC(NDS)-0764 is available.

Presentations

#	Author	Title	Link
1	J.-C. Sublet	Consultant Meeting on the Compilation of Nuclear Data Experiments for Radiation Characterization - CoNDERC	PDF
2	T. Ogawa	Role of event reconstruction algorithm and new radiation sources	PDF
3	O. Cabellos	On the International Radiation Characterization Benchmarks Experiment Project (IRCBEP): User s Point of View	PDF
4	D. Rochman	ICSBEP benchmarking...reaction rates	PDF
5	M. Gilbert	Nuclear data validation efforts	PDF
6	I. Gauld	V & V for Radiation Characterization Codes at Oak Ridge National Laboratory	PDF
7	A. Kahler III	ICSBEP...more than just k_{eff}	PDF
8	A. Kahler III	NJOY2016 (and NJOY2012) Status	PDF

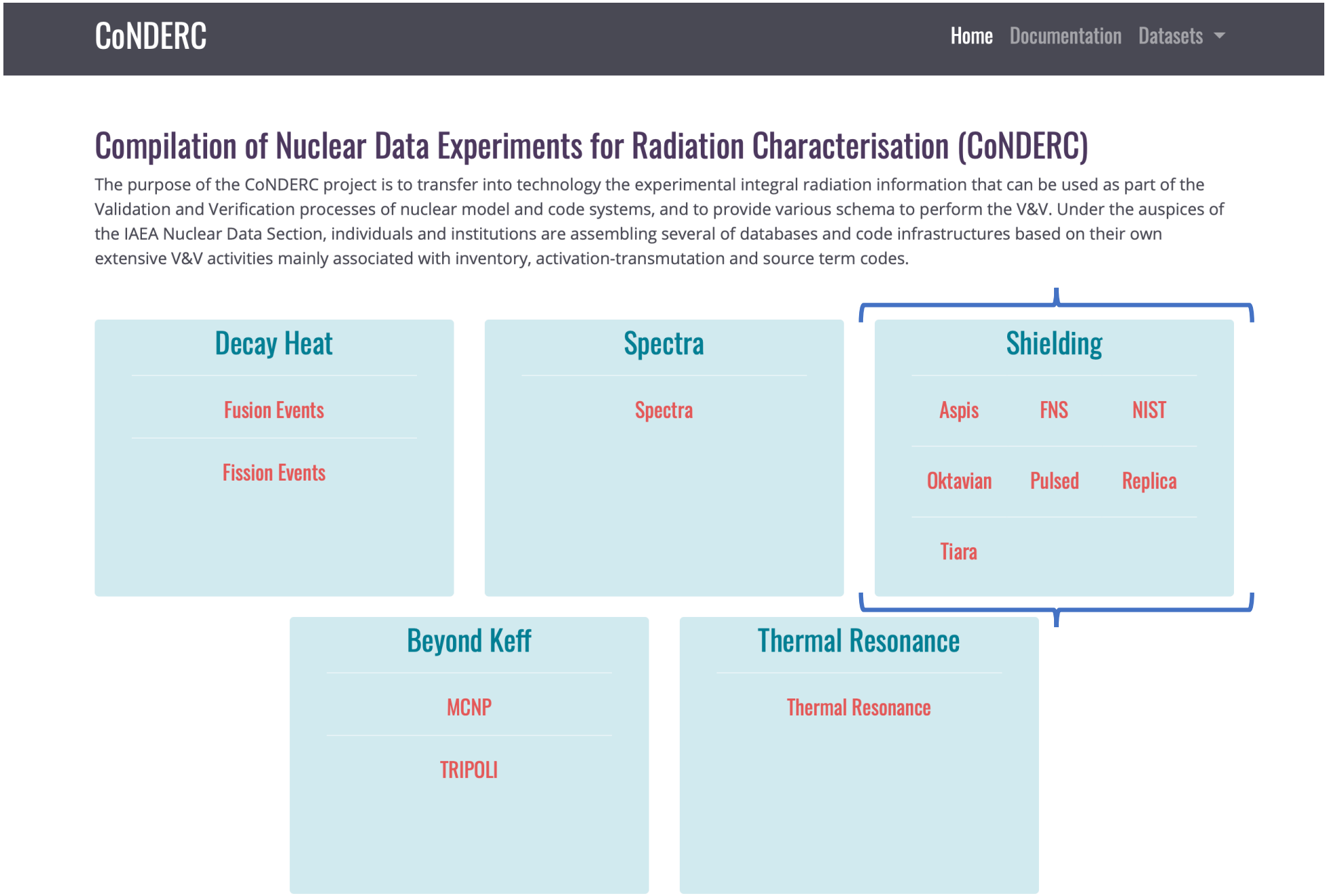
Purposes

- The purpose of the CoNDERC project is to transfer into technology the experimental integral radiation information that can be used as part of the Validation and Verification processes of nuclear model and code systems, and to provide various schema to perform the V&V

- Under the auspices of the IAEA Nuclear Data Section, individuals and institutions are assembling several of databases and code infrastructures based on their own extensive V&V activities mainly associated with inventory, activation-transmutation and source term codes

- The project has had a late additional, but noticeable and now lively entry: Shielding

CoNDERC https://nds.iaea.org/conderc



Shielding content

- Under a benchmark name directory
  - Monte Carlo code name (TRIPOLI, MCNP,…)
    - Inputs

      Verified input decks
    - Outputs_library

      Validated simulation output results
    - Benchmark_Exp

      Experimental information in computer readable format
- The aim is accessibility, openness and above all traceability and repeatability

Shielding entries

- JAEA Fusion Neutron Source slab: 6 materials, 21 cases
- NIST water sphere: 2 materials, 13 cases
- OKTAVIAN sphere: 11 materials, 11 cases
- LLNL pulsed sphere: 16 materials, 40 cases
- REPLICA: 1 case
- TIARA: 2 materials, 4 cases
- ASPIS: 1 case
- …

- Libraries: JENDL-4.0, ENDF/B-VIII, JEFF-3.3, TENDL-2019, CENDL-3.2, JEFF-4.0T0
- Monte Carlo Simulation protocols: MCNP6.2, TRIPOLI4-10 but also OpenMC 0.4 and SERPENT2 on their ways

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CoNDERC

Home Documentation Datasets

Aspis

The database of shielding experiments (SINBAD) is hosted by the RSICC and is maintained as a basis for computer code, model and nuclear data jointly with the NEA data bank. This work carried out under the auspices of the IAEA Nuclear Data Section involves building upon the SINBAD project to delivers openly accessible, robust, upgradable simulation codes inputs decks and protocols able to answer the needs of the wider radiation shielding communities: reactor, accelerator, fusion alike.

As Monte Carlo simulation protocols and application nuclear data forms are tested jointly MCNP6© and TRIPOLI© input and output files for TENDL-2019, JEFF-3.3, JENDL-4.0 and ENDF/B-VIII.0 libraries are provided for the technical community.

Documentation

- B. Kos and I. A. Kodeli, "MCNP modelling of the TIARA SINBAD shielding benchmark" (INDC(NDS)-0785)
- B. Kos and I. A. Kodeli, "MCNP modelling of the ASPIS Iron88 SINBAD shielding benchmark" (INDC(NDS)-0771)
- S.C. van der Marck, "Shielding Benchmark calculations with MCNP-4C3 using JEFF-3.1 Nuclear Data" (21616/05.69455/P)
- More references..

Download all data
[21.6 MB, 36 files]

or

Access individual data sets

- TRIPOLI
  - inputs
- MCNP
  - outputs_tendl19
  - outputs_endfb7
  - inputs
  - outputs_jeff33
  - outputs_endfb8
  - outputs_jendl4

Last updated: 2020-11-23 10:55:23

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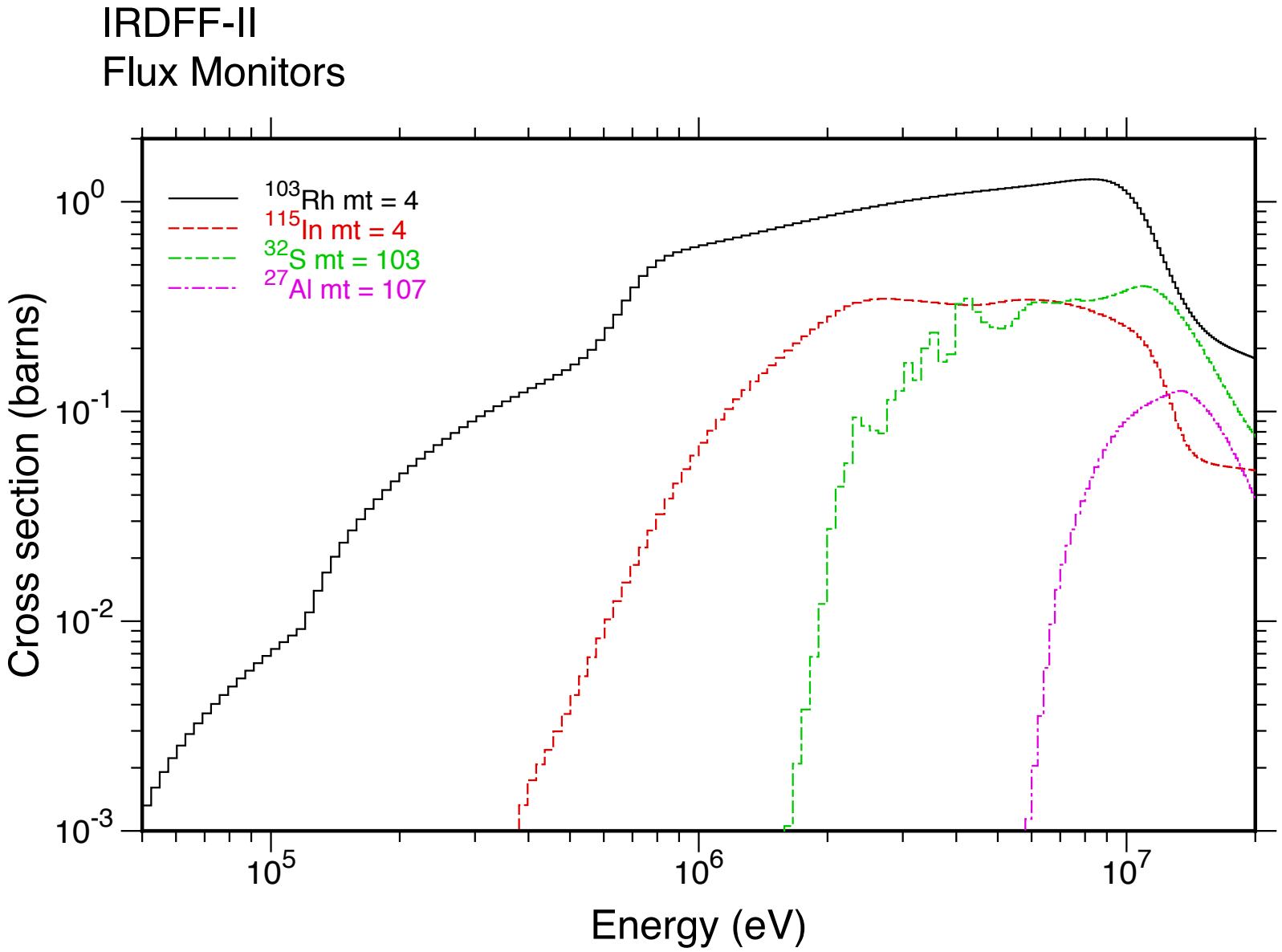
- More references..

The following graphical presentations illustrate some results:

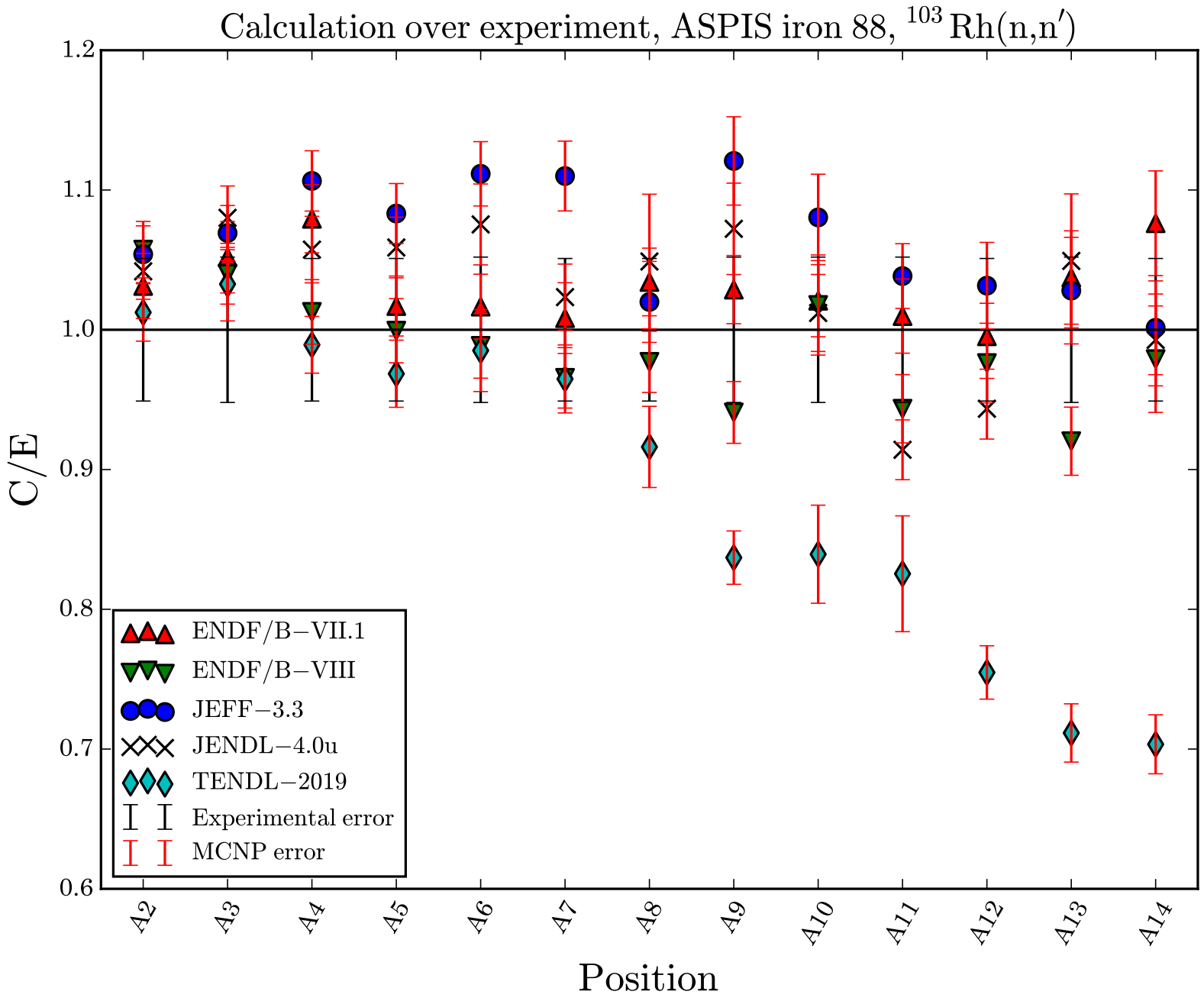
- TIARA concrete MCNP6 & TENDL-2019 results
- TIARA iron MCNP6 & TENDL-2019 results
- ASPIS iron88 MCNP6 & TENDL-2019 results

ASPIS Iron 88

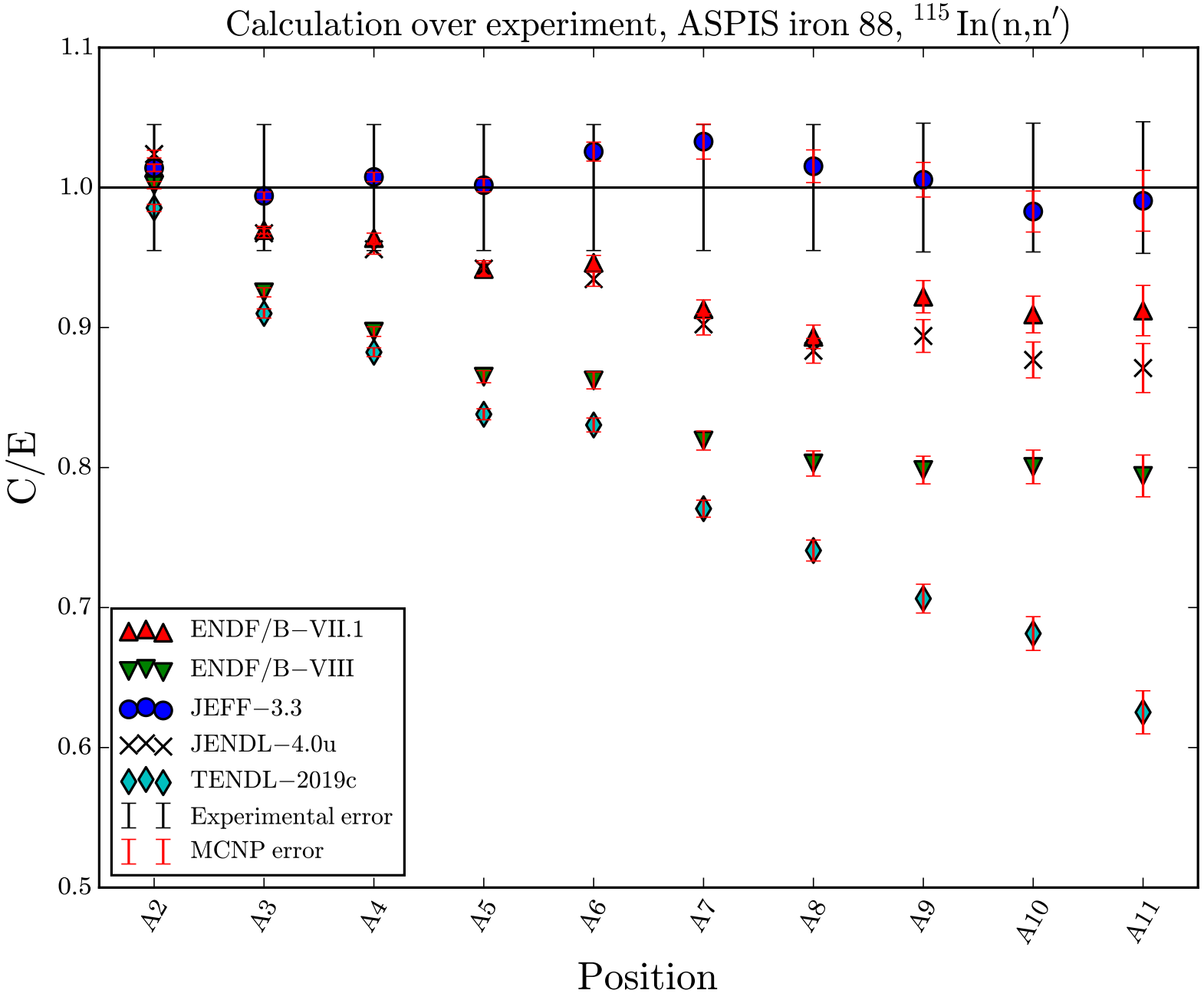
Neutron flux monitors and their energy range



ASPIS iron 88 – MCNP6.2



ASPIS Iron 88 - MCNP6.2



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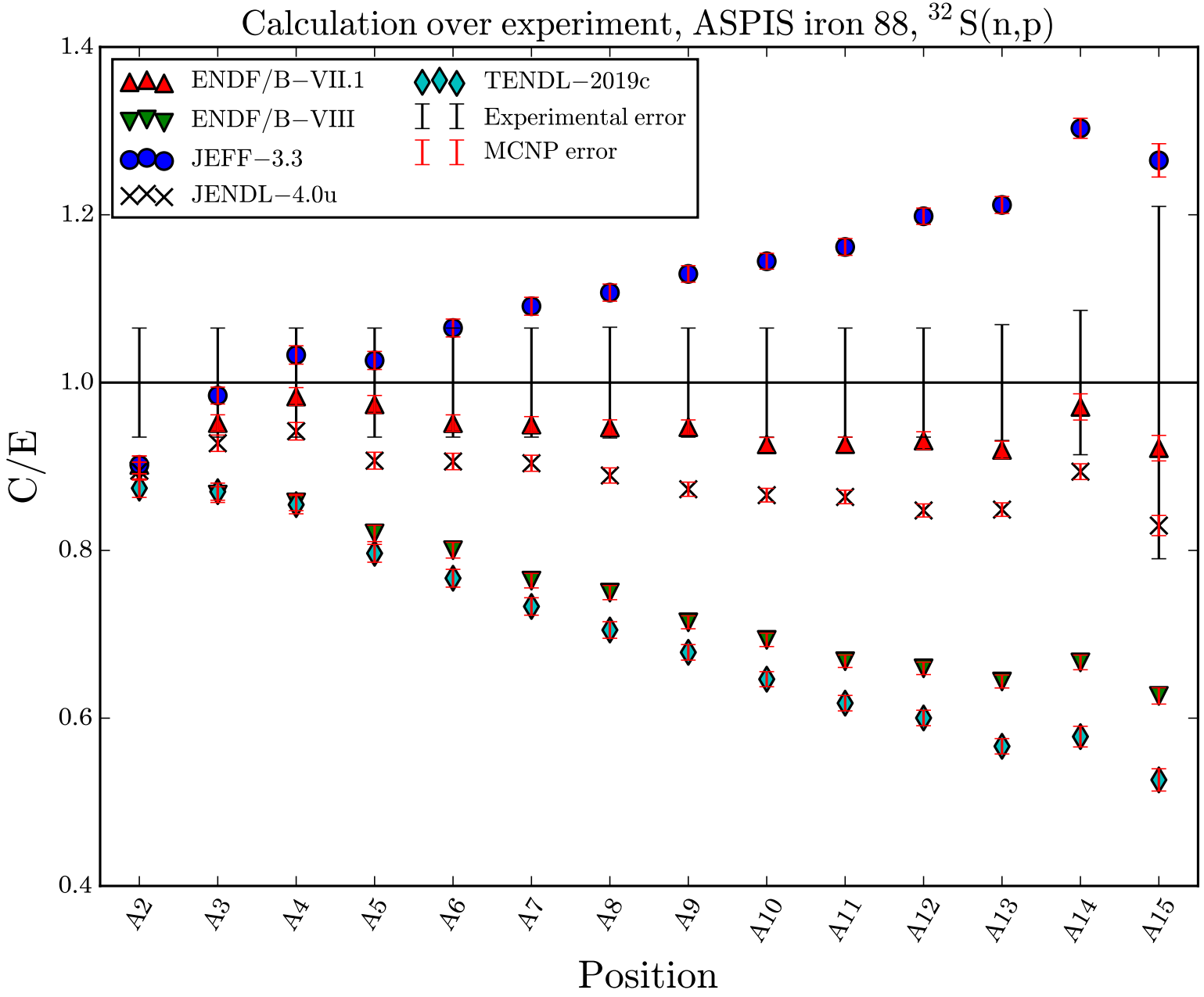
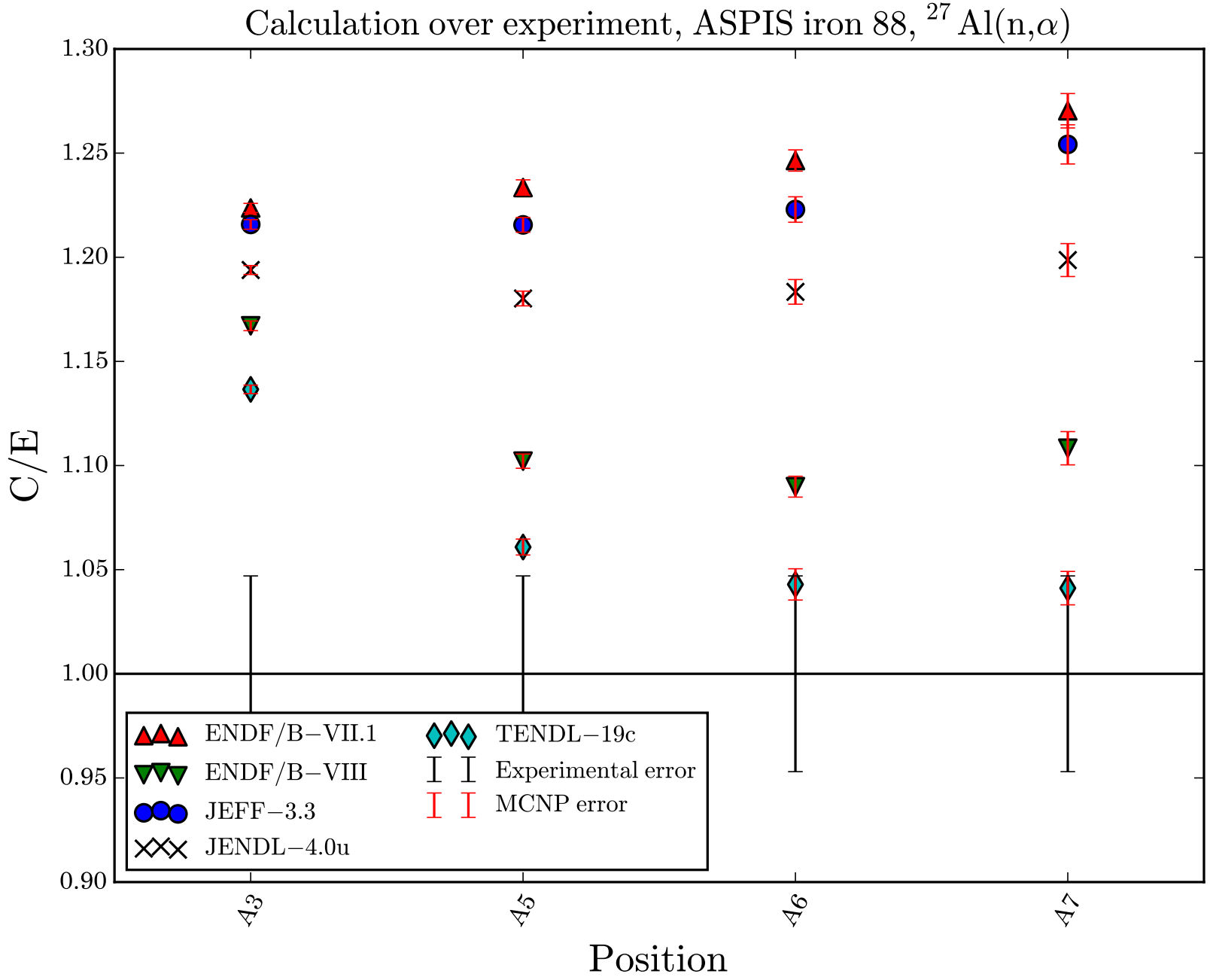
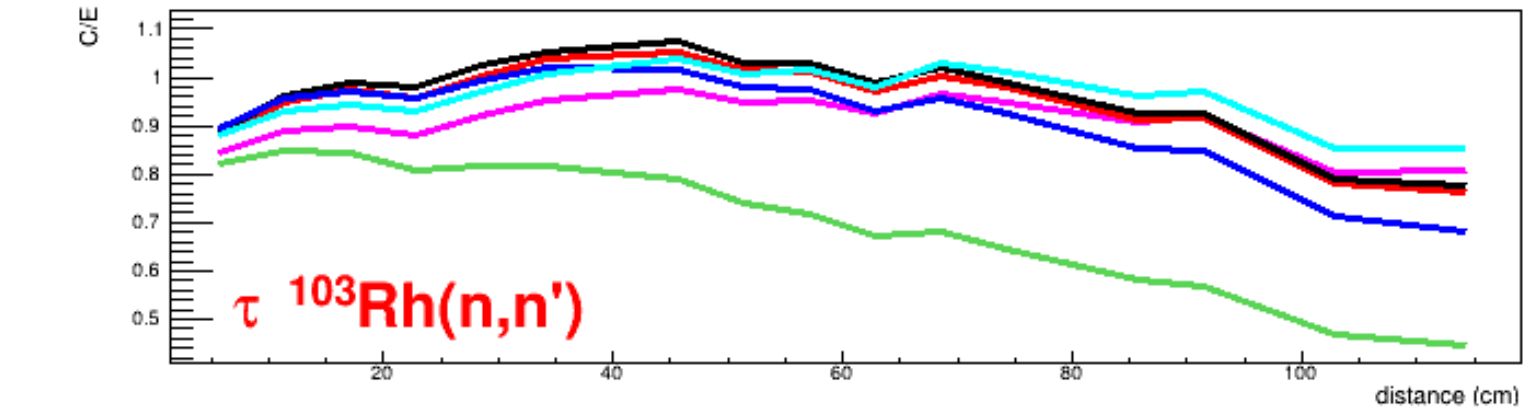


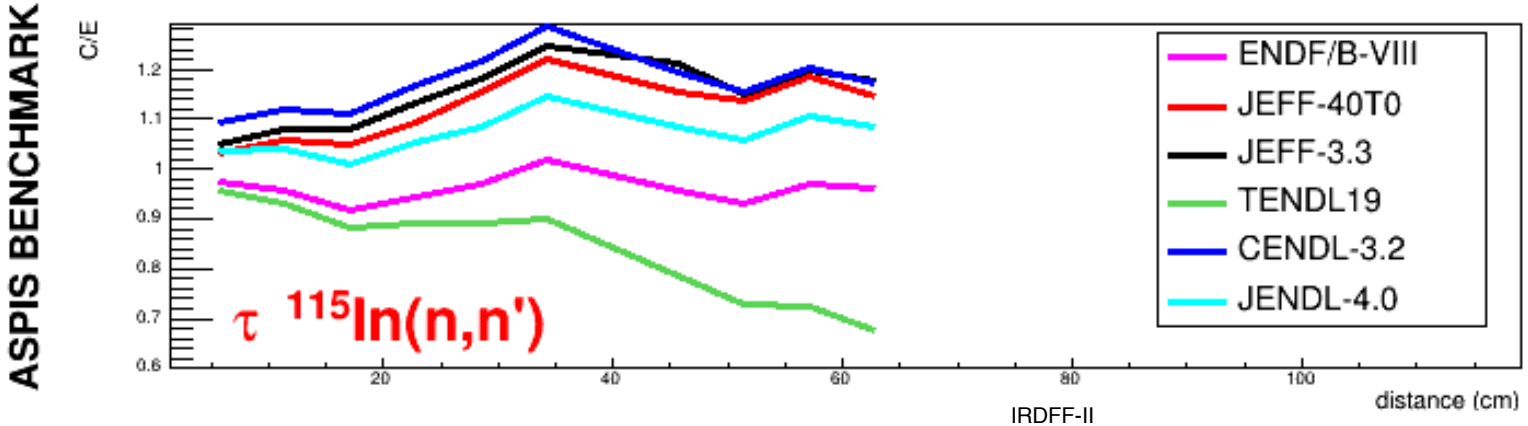
ASPIS Iron 88 - MCNP6.2



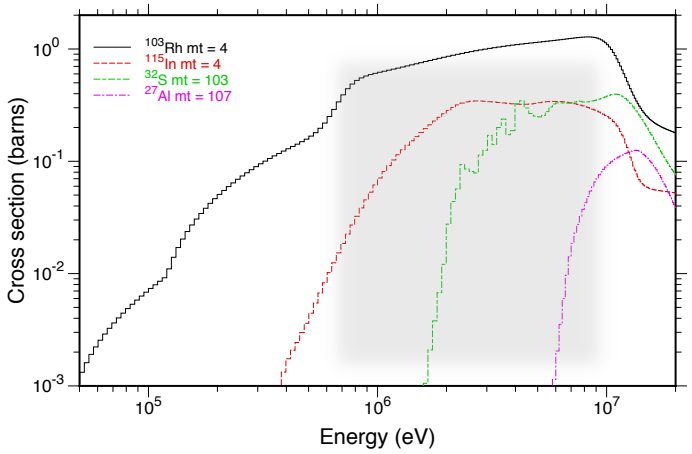
ASPIS Iron 88 – TRIPOLI4.10



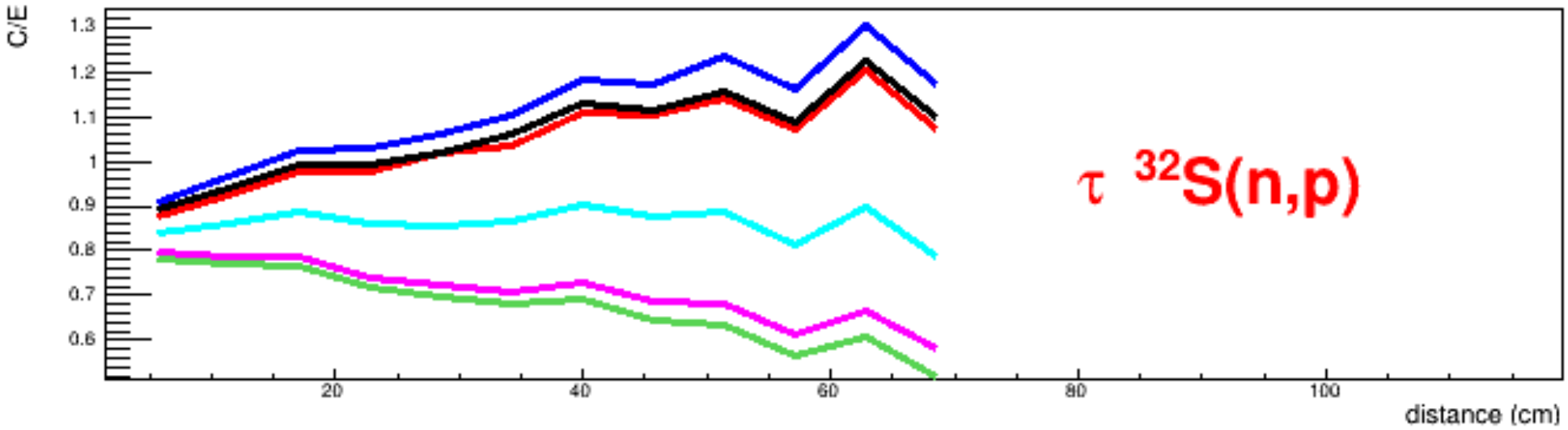
ASPIS BENCHMARK

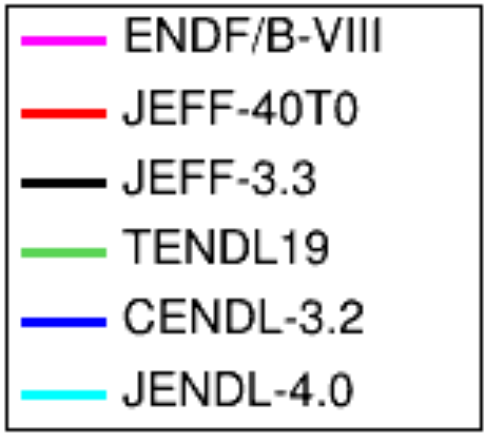


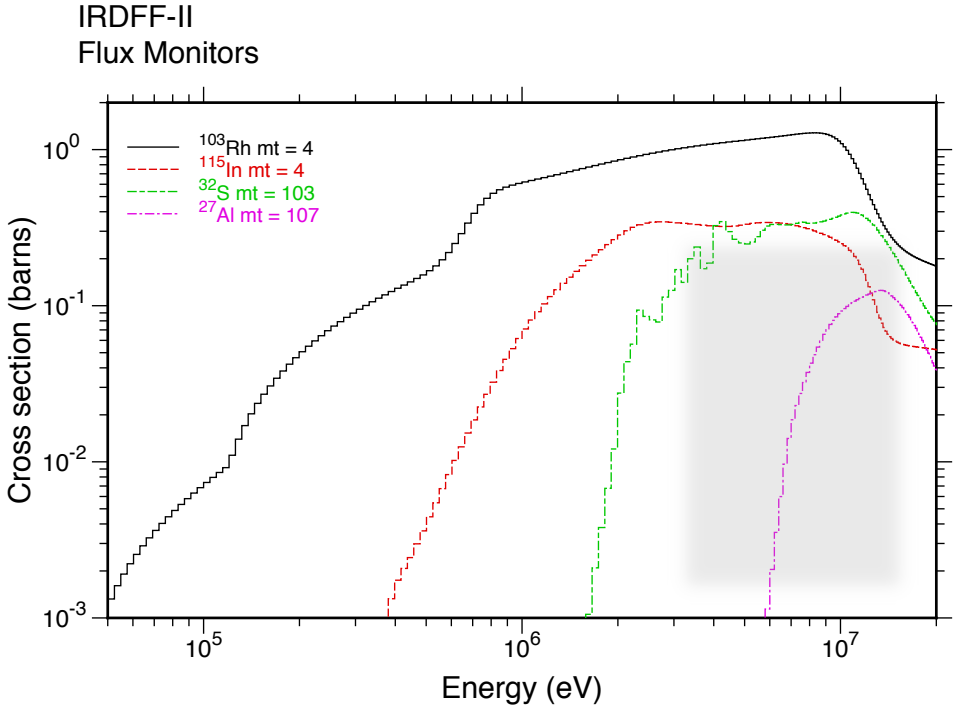
IRDFF-II
Flux Monitors



ASPIS Iron 88 – TRIPOLI4.10







ASPIS comments, remarks

- It is unlikely that for shielding getting it wrong in the high energy range, favor a right answer below once the neutron have sloowed down, or if it does …
- It is likely that the angular/energy distribution Monte Carlo sampling methods have a significant impact on the results
- It seems odd for the experimental uncertainty to be that constant, with little variability
- Converging a reaction rate is far more demanding that outputting a Keff +/- 5 pcm. Total S.D. may be irrelevant in the energy range where the reaction rate dominates, so the importance of variance reduction techniques (i.e. ADVANTG in the MCNP simulations)

CoNDERC

- The CoNDERC web site is now live and accessible

https://nds.iaea.org/conderc

- The web site is most likely to evolve rapidely, be upgraded selectively

- The pace at which this will be done will reflect the needs, application requirements, to have recorded, verifiable, traceable, accessible simulation protocols, results and computer formatted experimental information of relevance to the many shielding applications that need them

Thank you for your attention!

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