WPEC New Subgroup Proposal

Scattering Angular Distribution in the Fast Energy Range

- Criticality benchmark calculations imply the significance of elastic scattering angular distributions (mu-bar) in the fast energy range.
- These data are generally evaluated with a relatively simple method (optical model).
- If nuclear reaction models cannot predict mu-bar within a desired accuracy, we have to consider new experiments.
- NEA international collaboration subgroup:
  - strong relevance to the nuclear model code development,
  - evaluation of nuclear data files,
  - and limited capability of scattering data measurements in the world.

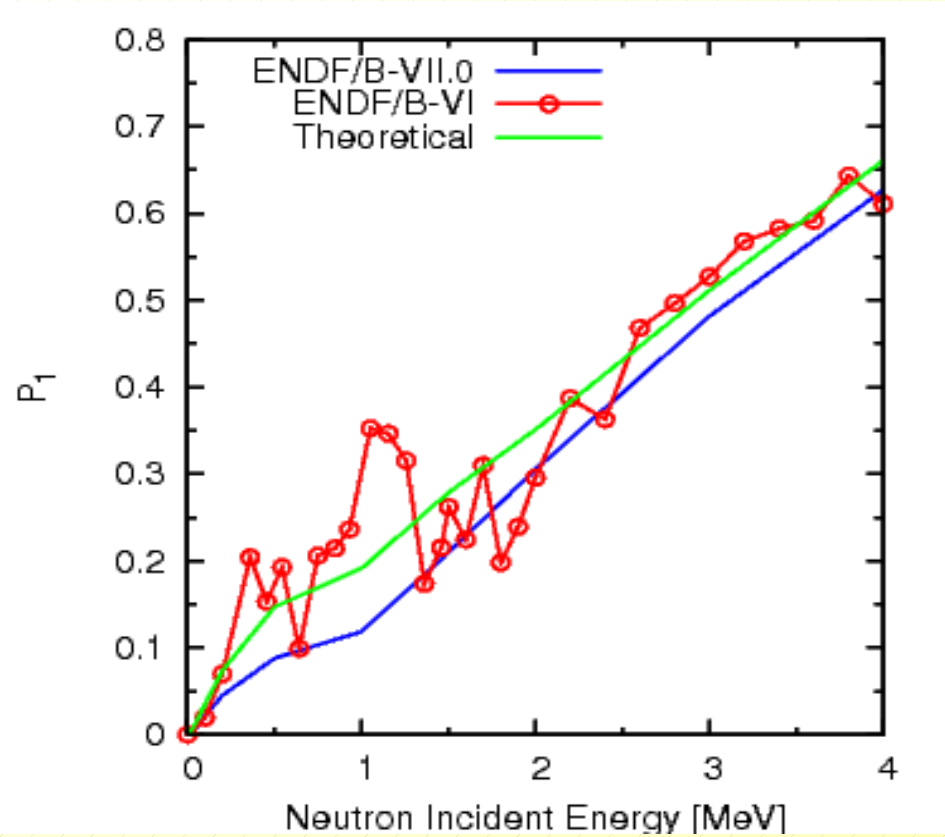
Relevant Issues in the Past

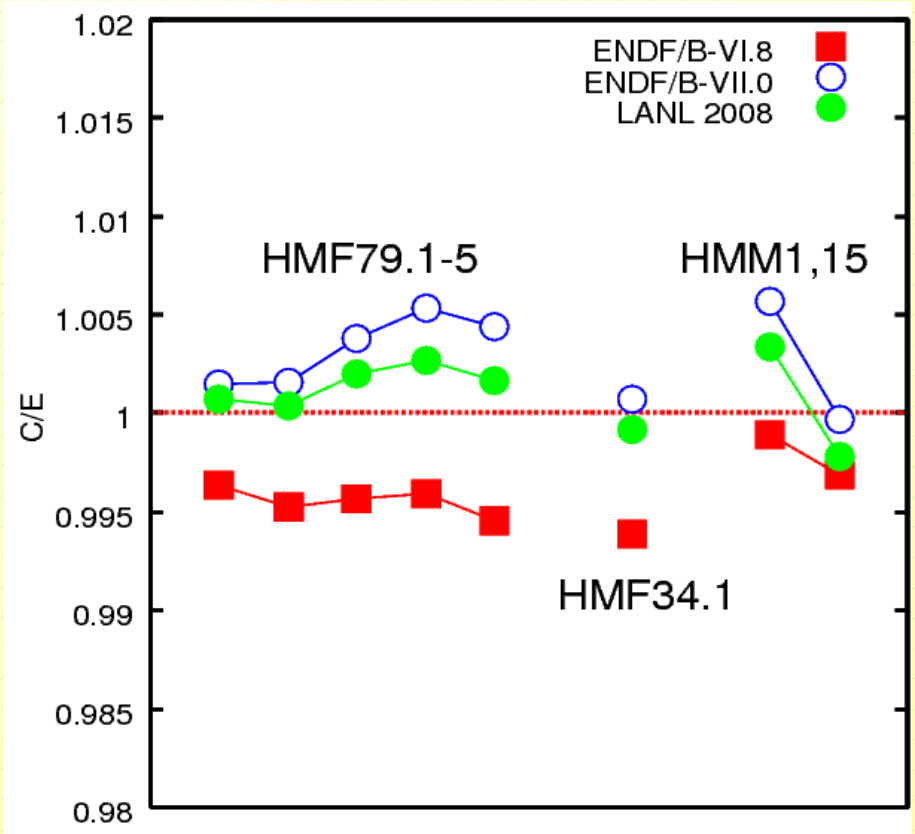
Problems Reported

- Iron shielding benchmark tests are sometimes problematic.
- Criticality safety benchmark test with the Ti-reflector indicated that mu-bar calculated with the optical model does not work so well.
- mu-bar for Na and Fe are by factor 2-3 larger than what we estimate and there is a structure, which cannot be reproduced by a simple optical model calculation.
- Values of mu-bar for U238 in the fast energy range differ considerably among the evaluated data files.

Impact of P_1 Component, Example

ICSBEP Ti-Reflected Cores





Definition and Proposed Activities

Definition of Group, and Proposed Activities

- This subgroup will consist of three major efforts
  - improve evaluation method of scattering angular distributions
  - identify integral benchmarks in which the scattering data play important role
  - provide better evaluations, and help experimentalists to design and conduct new scattering measurements

- Our primarily target will be three materials, i.g. Na, Fe, and U.

- When concluded optical model calculation is inappropriate, new experiments should be planed:
  - T. Hill (INL) leads a university collaboration on the scattering angular distribution measurements.
  - This subgroup will be able to support this experiments from both planning the measurements and theoretical modeling in the data analysis when available.

Participants

Confirmed Participant to the Proposed Subgroup

- Monitor
  - M. Ishikawa (JAEA)
- Coordinator
  - T. Kawano (LANL)
- Participants
  - USA
    - M. Pigni (BNL), T. Hill (INL)
  - Europe
    - A.J. Plompen (IRMM), G. Noguere (CEA),
    - A. Koning (ENG)
  - Japan
    - N. Iwamoto (JAEA)
  - and someone on criticality benchmark testing

Time-Schedule

- 2011
  - identify problems in the scattering angular distribution in the fast energy range
  - study integral data, which may have high sensitivities to mu-bar (possibly in conjunction with SG33)
  - survey currently available evaluations and their methodology

- 2012
  - develop a new scattering angular distribution modeling
  - create interim data files, perform integral calculations

- 2013
  - produce recommended data files
  - produce a list of recommendation for new experiments
  - produce a final report