Kinematics Bugs in Neutron Inelastic Reactions

Requester : Z. Hartwig (MIT)

Responsible : D. Wright, T. Koi

- Is it possible to fix the known nuclear kinematics bugs in the exit channel for several neutron inelastic reactions? I understand that this may not be possible with the current G4NDL implementation of the ENDF/B-VI library.

- For details, I refer you to several Hypernews posts:
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/hadronprocess/1045.html
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/hadronprocess/1032.html
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/hadronprocess/461.html
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/phys-list/530.html

- In light of this and for scientific reasons, could priority be placed on upgrading the "HP" data driven neutron libraries (either with G4NDL or some new format) to ENDF/B-VII.0 libraries?

Response (Sept. 2010)

- In this case the kinematic bugs come from the ENDF data itself, and the HP model is not capable of correcting them. Please see Tatsumi's post on the corresponding HyperNews items.

- There is currently no plan to update G4NDL to ENDF-VII This is partly because the HP model does not fully support the latest ENDF format, and because we do not have sufficient manpower to make the somewhat large changes that would be required in the existing code.

- Concerning Li, we have already confirmed that the situation you describe in your first point, is solved using the NLD data from ENDF-VII. We will use this to replace the Li data for the next release.

Direct Access to ENDF/B

Requester : Z. Hartwig (MIT)

Responsible : D. Wright, T. Koi

- Would it be possible to release/create a nuclear data processing tool similar to the US NJOY code (http://t2.lanl.gov/codes/njoy99/index.html) such that users could process ENDF/B data directly into usable formats for Geant4? I have read that there is a group working on this, but I am not sure of the state.

Response (Sept. 2010)

- We use NJOY for producing G4NDL. Under its license, we cannot copy or distribute it. It would be great if this or some alternate code someday became freely available, but we don't know who, if anyone, is working on this.

Low Energy Ion Reactions

Requester : Z. Hartwig (MIT)

Responsible : D. Wright, T. Koi

- Some very nice recent work has been done to extend Geant4 toolkit for PIXE analysis (particle induced x-ray emission) of materials; however, many of the low energy (< 100 MeV) charged particle reactions are either poorly modeled or not modeled at all (the deuteron-deuteron reaction, for example) even though excellent cross sections exist in the ENDF/B charged particle libraries for protons, deuterons, He3 ions (all used extensively for materials analysis by the ion beam analysis community). I understand that particle production for ion irradiation is difficult and existing models are all over the place. However, I think there may be interest in modeling these reactions, especially from the ion beam analysis community.

- For more information:
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/hadronprocess/1080.html
    - http://hypernews.slac.stanford.edu/HyperNews/geant4/get/hadronprocess/907.html

Response (Sept. 2010)

- Such data-driven models, based on charged particle ENDF libraries, are within the scope of our development plan. However, again due to lack of manpower, we can't offer a firm timeline for this.

- As mentioned above, some requests could be fulfilled given sufficient resources. In Geant4 we are happy to collaborate with users who may have a specific task, and wish to take on a significant role in the development.