

New Subgroup on High Energy Nuclear Data

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Present Situation

Attached is our understanding how to evaluate the high energy data.

Important tasks are

- 1) Collection of experimental data,
- 2) Intercomparison of the presently existing codes,
- 3) Development of more innovative model code,
- 4) Evaluation for the World Common Library.

Task 1 should be carried out by the Data Centers with interlaboratory cooperations. Task 2 is suitable to an international cooperation. But NEANSC already established benchmark group leaded by Dr. H. Gruppelaar. Task 3 is at a stage of fundamental research and should be made by each research group. Though information exchange is important among the groups, this is not suitable to the international cooperation as actual work. Task 4 contains the World Common Format, Conception of World Common Library etc. and might be suitable to the international cooperation in future. But this should be done after the tasks 1-3 proceed to some stages.

Conclusion

So I propose to postpone establishing the new subgroup at least to 1994 when the NEANSC benchmark of Dr. Gruppelaar gets the results.

High Energy Nuclear Data Evaluation

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1. Required Nuclear Data

- a) Particle emission DDX → shielding, particle transport
- b) Isotope production data → low-activation, medical
- c) Total, elastic, non-elastic → shielding
- d) Fission cross section → not negligible (100 mb at 1 GeV for Pb)

2. Collection of Experimental Data

- Expansion of EXFOR data
- Encourage experimental data
- Thin target yield data required

3. Evaluation Methodology

3.1 Data Fitting

Not enough experimental data exist.

3.2 Systematics

DDX Kalbach, Kalbach-Mann, Kumabe for low energy
Pearlstein for high energy
Fission Fukahori, CIS group

3.3 Theoretical Calculation

3.3.1 Analytical (Preequilibrium model)

- ALICE, EXCIFON, Luo-Kawai Model
- applicable up to a few hundred MeV

3.3.2 Intranuclear Cascade Model

- MCNP, HETC
- applicable above 150 keV

3.3.3 More Innovative Model

- Quantum Molecular Dynamics (QMD)
- Relativistic QMD
- Vlasov-Uehling-Uhlenbeck (VUU)
- Relativistic VUU

Practical codes have not yet been developed.

3.4 Standard Methodology

- Not yet fixed
- Will be discussed in 92 BNL Symposium?

4. Evaluated Nuclear Data File

4.1 Format

Is the ENDF-6 format enough?

4.2 Selection of nuclides

Important nuclides are common among transmutation, medical use and astrophysics.

4.3 World common Library

International cooperations must be helpful.