1. Modification analytical transmission calculations for two-body and fission reactions

2. Use UserDiffCS in Analytical transmission calculations for two-body reactions

3. Excitation Energy of fragments

4. Correction in the MC Output rays dialog
User Differential Cross Sections for Two-Body reactions: Analytical

Old analytical solution

MC test
User Differential Cross Sections for Two-Body reactions: Analytical

New analytical solution

MC test

Good!

OT, 03-Jul-2013, East Lansing
User Differential Cross Sections for Two-Body reactions: Analytical

http://lise.nscl.msu.edu/9_6/DifCS/18O_d_two-body_10MeVu_delta_D1.lpp

After Angular acceptance use

Analytical solution: 29% transmission

MC solution: 21% transmission

Thin target
Zero emittance
http://lise.nscl.msu.edu/9_6/DifCS/18O_d_two-body_10MeVu_delta_D1.lpp

After Angular acceptance + slits use

Analytical solution: 17.2% transmission

MC solution: 12% transmission
User Differential Cross Sections for Two-Body reactions: Analytical

http://lise.nscl.msu.edu/9_6/DifCS/18O_d_two-body_10MeVu_D1.lpp

After Angular acceptance + slits use

Analytical solution: 15.1% transmission

MC solution: 11.5% transmission

Target 10mg/cm²
Real emittance
3. User DifCS for Two-Body reactions – Excitation energy

Isotropic, $E^* = 0$

Differential cross section file

<table>
<thead>
<tr>
<th>Energy (MeV)</th>
<th>Cross Section (mb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MeV</td>
<td>0.1</td>
</tr>
<tr>
<td>2 MeV</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Note: The Differential Cross Section file is in an ASCII format. Comment string begins with "!" or "#".

Two columns, where the 1st is Angle in [degrees], the 2nd is DIFCS in System of Center mass [mb/ster]

The columns can be separated by a Space, a Comma or a Tabulation. User can put comments also at the end of data line.

Utilities:
- Green screen plots
- 2D Kinematics (MC)

Monte Carlo simulation of fragment transmission

18O (10.0 MeV/u) + H (1e-3 mg/cm²), Transmitted Fragment 18O (Two Body), Optics Order: 1
dp90=9.84%, Beta (Trunc) = 0.0281
Bounds: Off, "Stripper" - last block for MC calc; no gates; Config: DSA

Reaction's Kinematics
- Reaction energy of the reaction place: 10.0 MeV/u
- Scattering angle in CME: [0° - 15°] [0° - 60°]
- Cross section: 1.21 MeV (differential Scattering) [0° - 20°]
- Total energy options: "after reaction"

Monte Carlo Transmission Plot
- Energy range: 0.01 MeV to 10.0 MeV/u
- Cross section range: 0.01 mb to 100 mb
- Alpha angle range: 0° to 180°

After "Stripper" - Energy [MeV/u] vs. X(Thete) [radian]
3. User Differential Cross Sections for Two-Body reactions

Isotropic, $E^* = 6$

**Reaction's Kinematics**

- Angular dependence of target
- Reaction to the "enhance" of the target
- Reaction energy at the reaction place: 10.00 MeV
- Reaction angle in CMS: $\theta = 9.519$ deg
- Reaction energy at CMS: 4.376 MeV

**Monte Carlo Transmission Plot**

- Target: $^{180}$O + H (1.3 mg/cm²)
- Transmission Fragment: $^{180}$O (TwoBody)
- Optics Order: 1
- $d/dp = 0.84$
- $B_{charged}$: 0.9381
- Bounds: Off, "Stripper": 1st block for MC calc; no gates
- Config: DSA

**Differential Cross Section File**

- Data File: Load from file, View data, Clear data
- Number of rows: 190
- Data: $\theta_1 = 0.6$, $\theta_2 = 0$
- Comments: Description or notes
- Total: Integrated Cross Section (mb)
- Note: The Differential Cross Section file is in ASCII format.
- Utilities: Kinematics Plots, 2D Kinematics (MC)
4. Correction in the MC Output rays dialog

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<th>01-N (neutron number)</th>
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Last block "Stripper", setting fragment: 19O8+.8+ (Two body reaction); N_Locations=1; N_fields=7; N_Rays=100

Location #01: Stripper