1. Transmission information window: new orders, new positions, new titles
2. Menu "1D-plot" -> "Transmission characteristics": new parameter "#2 Total isotope transmission"
3. Using (p,n) reaction in the DifCS dialogs (TwoBody reaction)

**9.6.123 09/30/13**

4. Correction in calculation for transmission through materials (so called "unstopped in material" coefficient). **IMPORTANT!!!**
5. Gas Cell utility modification
6. Correction in Monte Carlo $E_{\text{loss}}$ and Range plots

**9.6.126 10/03/13**

7. Neutron and Gamma induced reactions in the Kinematic Calculator
8. Corrections in transmission subroutines: modification for large angular straggling @ very low energies
9. Corrections in transmission subroutines in the case of materials: previous disperse block matrices were used instead using any optical block matrices

**9.6.133 10/09/13**
1. Modifications in the Transmission information window

- New order in the transmission window,
- Title modification

Previous order
2. Total isotope transmission for all reactions

v.9.6.123 from 09/30/13

Choose a Plot Type

- Transmission characteristics

Plot type:
- Isotopes, Z=const
- Isotones, N=const
- Sum(where) Z=const
- Sum(where) A=const
- Sum(where) N=const

N_{min} = 0
N_{max} = 200

Options:
- All
- Odd
- Even

- Q (protons)
- A (nucleons)
- N (neutrons)
- N/Z (spin)
- N-Z

OK Quit
2. Total isotope transmission for all reactions

[2] Total ISOTOPE transmission for all reactions [%]

\[ ^{238}\text{U} (24.1 \text{ MeV/\text{u}}) + ^{12} \text{C} (15 \text{ mg/cm}^2); \text{ Settings on } ^{96}\text{Zr}^{39+}; \text{ Config: DSA} \]
\[ \text{dp/p=0.81\%; Brho(Tm): 1.8000} \]
\[ N=0-200 \]
2. Total isotope transmission for all reactions

Zoom of the previous plot

[2] Total ISOTOPE transmission for all reactions [%]

$^{238}\text{U}$ (24.1 MeV/u) + C (15 mg/cm$^2$); Settings on $^{96}\text{Zr}^{38+39+}$; Config: DSA

dp/p=0.81% ; Brho(Tm): 1.8000

N=0-200

<table>
<thead>
<tr>
<th>Protons (Z)</th>
<th>41.2</th>
<th>40.8</th>
<th>40.4</th>
<th>40.0</th>
<th>39.6</th>
<th>39.2</th>
<th>38.8</th>
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<table>
<thead>
<tr>
<th>Neutrons (N)</th>
<th>e-02</th>
<th>6.1e-02</th>
<th>5.8e-02</th>
<th>5.4e-02</th>
<th>4.8e-02</th>
<th>4.1e-02</th>
<th>3.3e-02</th>
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</thead>
<tbody>
<tr>
<td>1γ</td>
<td></td>
<td>92γ</td>
<td>93γ</td>
<td>94γ</td>
<td>95γ</td>
<td>96γ</td>
<td>97γ</td>
</tr>
</tbody>
</table>

$^{92}\text{Zr}$, $^{93}\text{Zr}$, $^{94}\text{Zr}$, $^{95}\text{Zr}$, $^{96}\text{Zr}$, $^{97}\text{Zr}$, $^{98}\text{Zr}$
3. Using \((p,n)\) reaction in the DifCS dialogs (TwoBody reaction)

LISE++ automatically proposes \((p,n)\) case, if the conjugate fragment has been chosen.
4. Correction in calculation for transmission through materials (so called "unstopped in material" coefficient)

5. Gas Cell utility modification

**Number of particles stopped in GasCell 120Torr**

\[^{40}\text{Ca} (140.0\ \text{MeV}\text{u}) + \text{Be} (957.24\ \text{mg/cm}^2)\]; Settings on \(^{3}\text{He}\); Config: DDSWDSDDMMDWMSMNM

dp/d\theta=1.00\% ; Wedges: Al (145.55 mg/cm²), Al (2000 \mu m); B/h\eta(Tm): 2.6931, 2.6931, 2.5434, 2.5434...

A - yield before FinalDegrader; B - yield before GasCell_120Torr; C - yield after GasCell_120Torr

**Version 9.6.123**

**Version 9.6.126**
6. Correction in Monte Carlo Eloss and Range plots
6. Correction in Monte Carlo $E_{\text{loss}}$ and Range plots

Projections of spectra from the previous slide
7. Neutron and Gamma induced reactions in the Kinematic Calculator

9.6.132 10/08/13
7. Neutron and Gamma induced reactions in the Kinematic Calculator

Reaction's Kinematics

\[ {}^7\text{Be} + {}^4\text{He} \rightarrow {}^9\text{Be} + {}^3\text{H} \]

Neutron Energy at the reaction place: 20.00 MeV

Q reaction: -10.44 MeV (Excitations 0.0 + 0.0 = 0.0 MeV) Plotted Energy option is "after reaction"
7. Neutron and Gamma induced reactions in the Kinematic Calculator

\[ ^3\text{H} \text{ fragment kinematics} \]

\[ ^3\text{H} + ^{11}\text{Be} \rightarrow ^2\text{H} + ^7\text{Li} \]  (Projectile Energy : 20.00 MeV)

\[ Q \text{ reaction} : -10.44 \text{ MeV} \] (Excitations 0.96, 0.96, 0.96, 0.96)

Angular Distribution (CM): Isotropic
7. Neutron and Gamma induced reactions in the Kinematic Calculator

Reaction's Kinematics

\[ ^{10}_n + ^{10}Be \rightarrow ^{10}_n + ^{10}Be \rightarrow ^{10}Be(\gamma, n)^{11}Be \]

Neutron Energy at the reaction place: 20.00 MeV
Q-reaction: -10.00 MeV (Excitation 0.0+0.0=-0.0+10.0), Plotted Energy option is "after reaction"

Kinematics calculator (relativistic):

- Two Body Reaction: \( B(\gamma, D) \)
- Scattering: \( B(\gamma, D) \)

Data:

- NE (MeV): 0.07
- Reaction Energy: 20 MeV
- Target Energy (MeV): 1.00±0.10
- Target Thickness: 1.00 mm

Calculations:

- Angle [deg]: 40.341, 40.828
- Lab: 40.341, 40.828

Plots:

- Angle [Lab-deg]
- Angle [CMS-deg]
- Energy [MeV]
7. Neutron and Gamma induced reactions in the Kinematic Calculator

<table>
<thead>
<tr>
<th>Reaction's Kinematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma + \text{U} \rightarrow \text{Zr} + \text{Te}$</td>
</tr>
<tr>
<td>$\text{U} + \gamma(\text{gamma}) \rightarrow \text{Zr} + \text{Te}$</td>
</tr>
<tr>
<td>Gamma Energy at the reaction place: $150.00$ MeV</td>
</tr>
</tbody>
</table>
| Q(reaction): $23.87$ MeV | (Excitations $0.0+0.0\rightarrow56.0+60.0$) | Picked Energy option is "after reaction"

**Calculations**

<table>
<thead>
<tr>
<th>Calculations</th>
<th>CM</th>
<th>LAB</th>
<th>CM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counting in monitor</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Differential Cross Section</td>
<td>1.22</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>Energy of reaction</td>
<td>1.22</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>Energy at the reaction of californium</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Maximum Angle</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Solid Angle</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Delta Theta</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Angle [Lab-deg]</td>
<td>40</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Energy [MeV]</td>
<td>2</td>
<td>4</td>
<td>2</td>
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</tbody>
</table>

**Diagram**

The diagram shows the kinematic plots for the reaction scenario, including plots for angles in both CM and LAB frames, as well as energy plots. The plots illustrate the kinematic relationships between the initial and final states of the reaction, demonstrating the energy and angle distributions.
8. Corrections in transmission subroutines: modification for large angular straggling @ very low energies

- 9.6.123

- 9.6.132
Corrections in transmission subroutines in the case of materials:

previous disperse block matrices were used instead using any optical block matrices