

These $P=f(\text{angle})$ and $E=f(\text{angle})$ functions will be used in the Monte Carlo mode for the primary beam transmission calculations

Angular straggling \equiv multiple scattering through small angles

How distinguish in Monte Carlo simulations ?

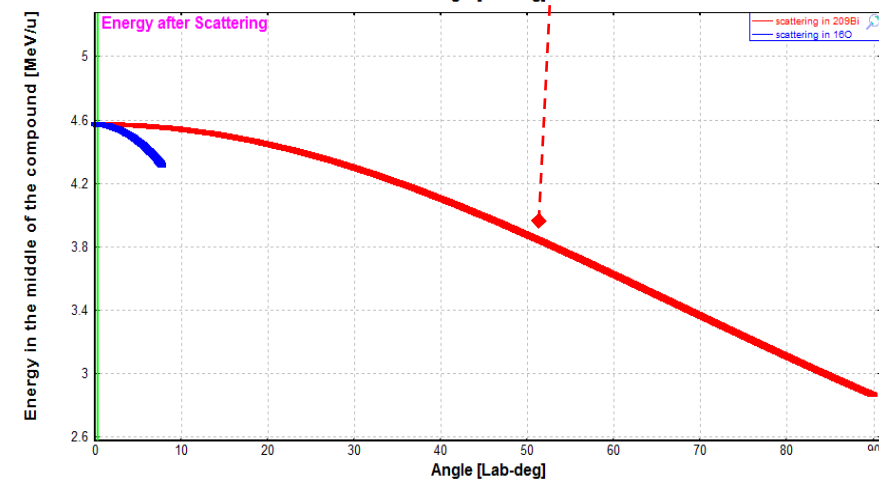
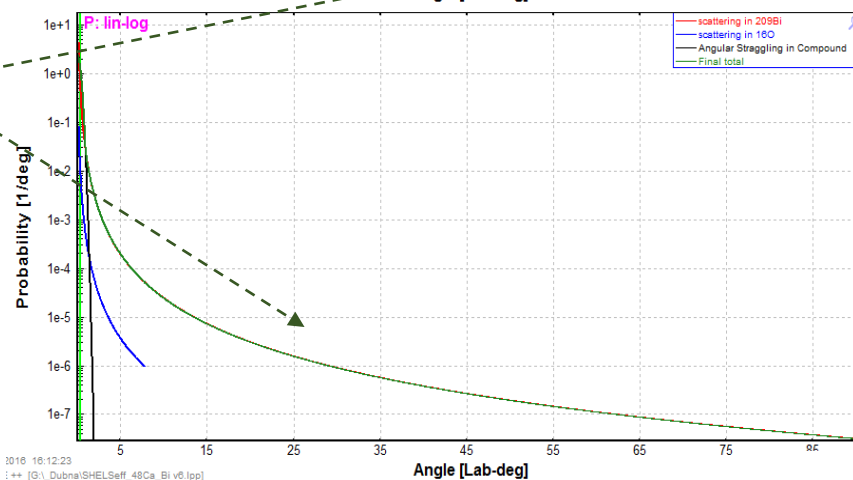
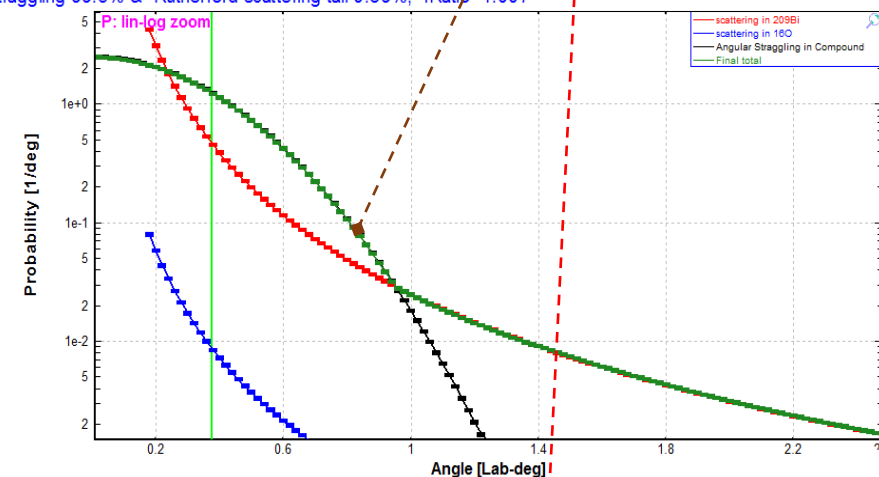
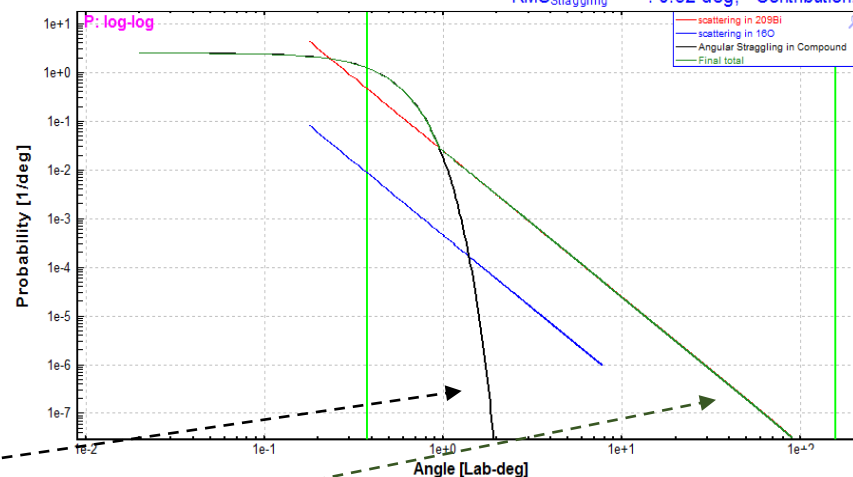
- Angular straggling (small angles)
- Rutherford scattering (large angles)

The nature is one for both processes. It is necessary to have only one probability distribution for scattering process through a material segment.

Good benchmarks for angular straggling models!
(Should be double crossing)

Angular Straggling & Rutherford scattering probabilities in compound

^{48}Ca (4.61 MeV/u) + BiO_2 (0.4 mg/cm²)
Grazing & maximum kinematic angles (in degrees) @ middle of material: [0] ^{209}Bi : 156.9 & 180.00; [1] ^{16}O : 7.8 & 19.48
RMS_{Straggling}^{space}: 0.32 deg; Contribution: Straggling 99.3% & Rutherford scattering tail 0.69%; IRatio=1.007



Reactions

- TWO BODY reaction $B(A, C)D$
- SCATTERING $B(A, C=A)D=B$
- BREAKUP (FISSION) $x(A, CD)x$ (gamma-emission)

Use Moti's scattering

For Kinematics Plots use energy values

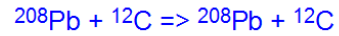
- after reaction
- at entrance of detectors

Kinematics plots

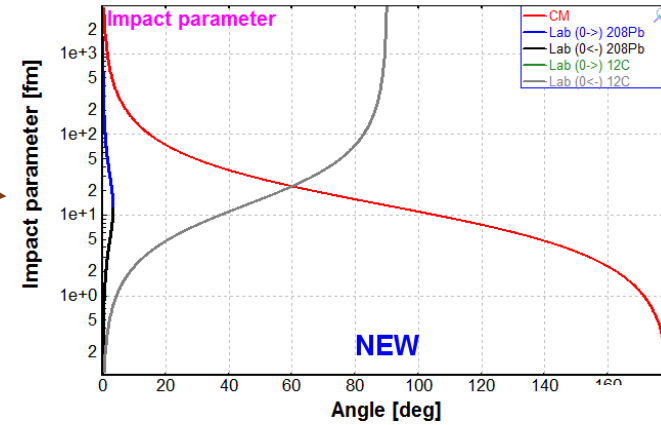
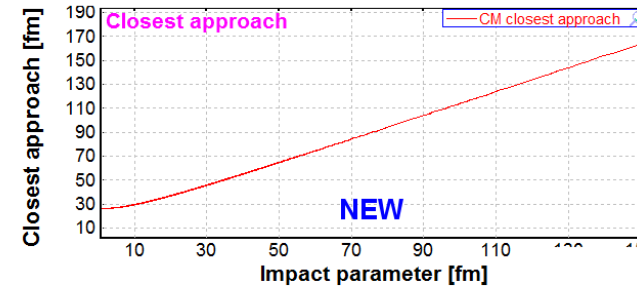
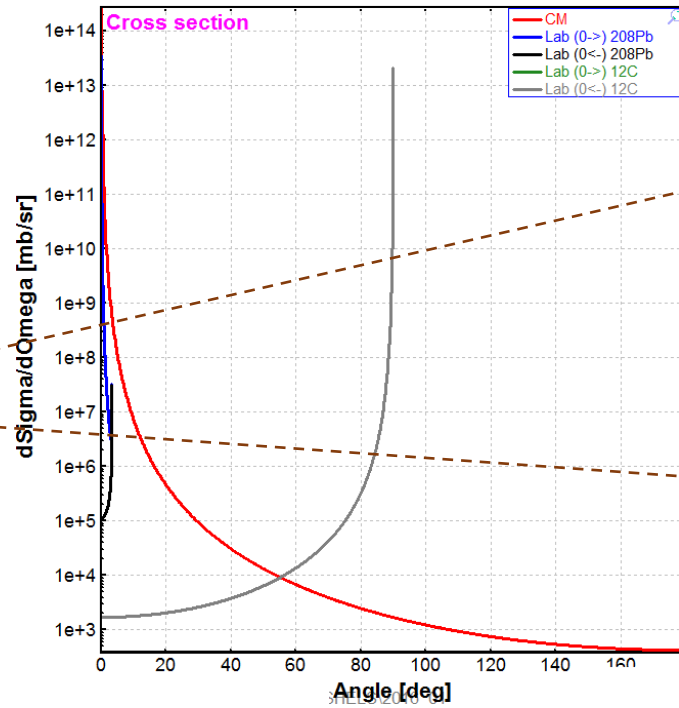
Rutherford plot

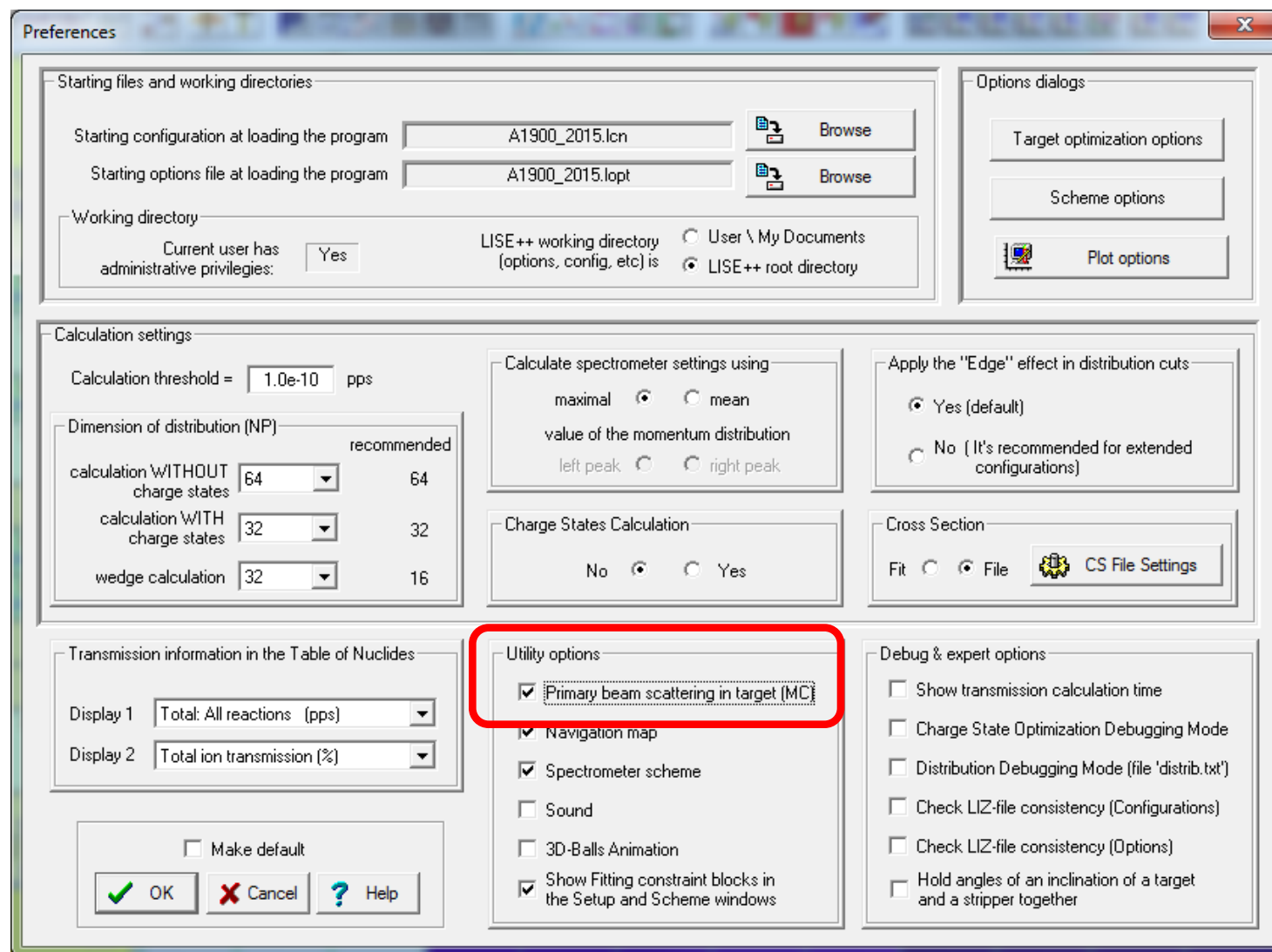
By product of Fusion reaction update and “Rutherford scattering and Angular straggling” utility

Rutherford scattering



Projectile Energy at the reaction place: 2.39 MeV/u

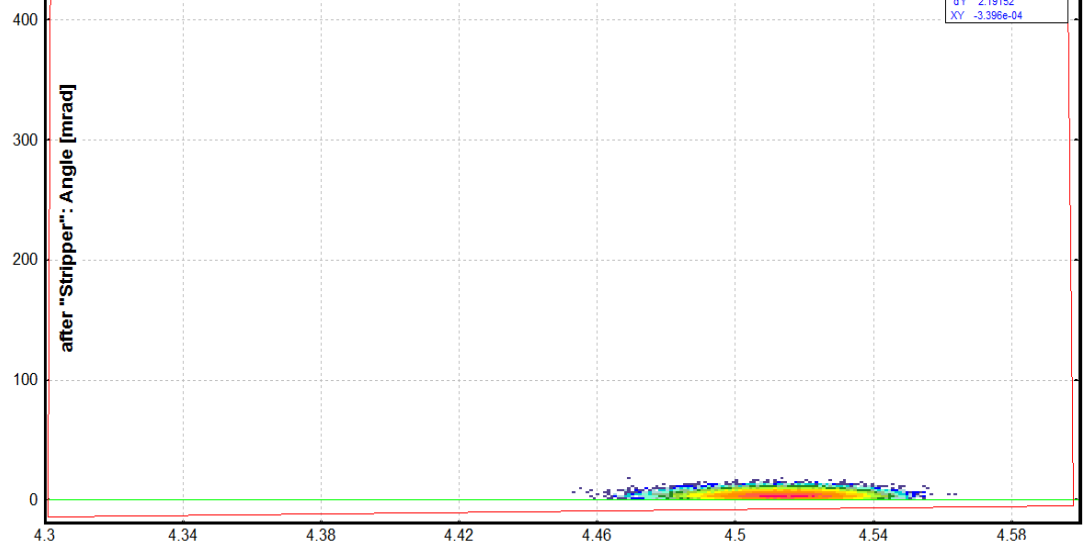




Light beam & heavy target

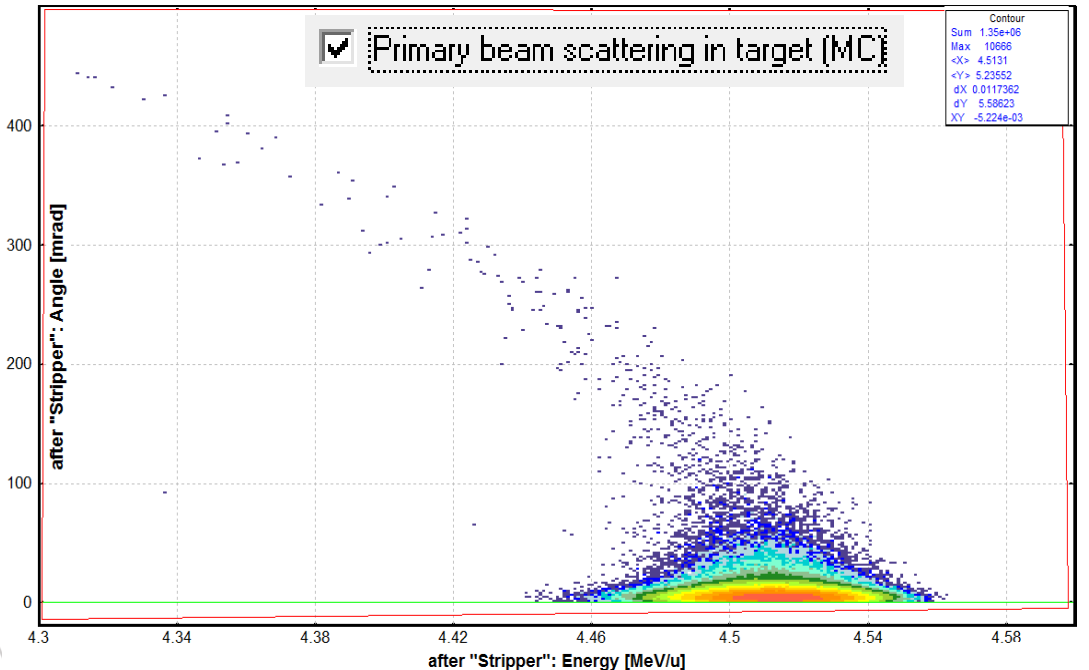
Primary beam scattering in target (MC)

Contour
Sum 1.15e+05
Max 1419
<X> 4.51369
<Y> 3.61372
dX 0.0116178
dY 2.19152
XY -3.396e-04



Primary beam scattering in target (MC)

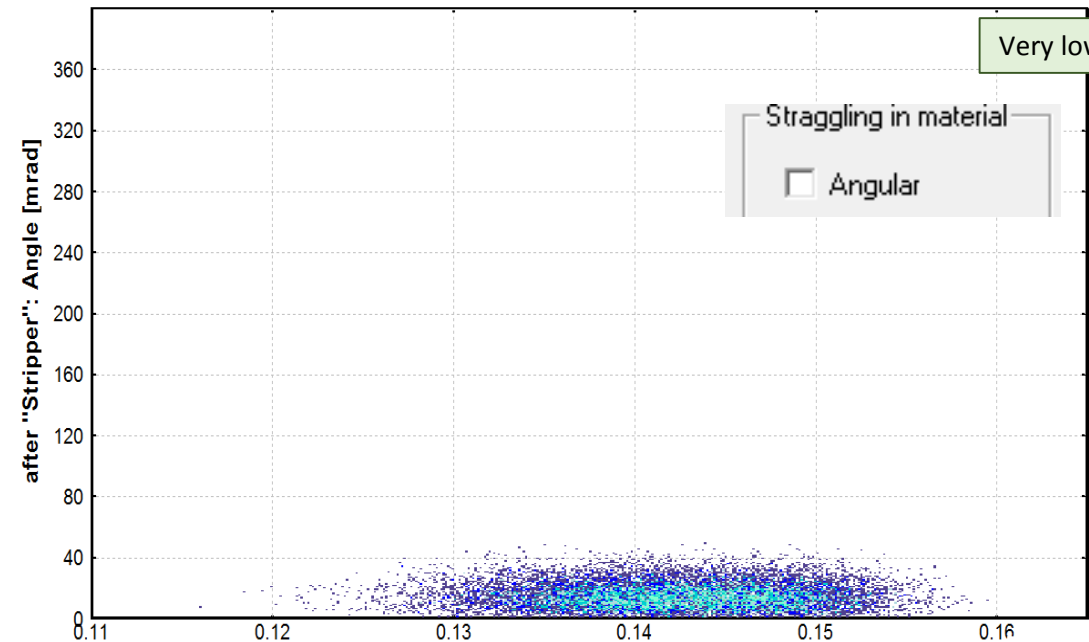
Contour
Sum 1.35e+06
Max 10666
<X> 4.5131
<Y> 5.23552
dX 0.0117362
dY 5.59623
XY -5.224e-03



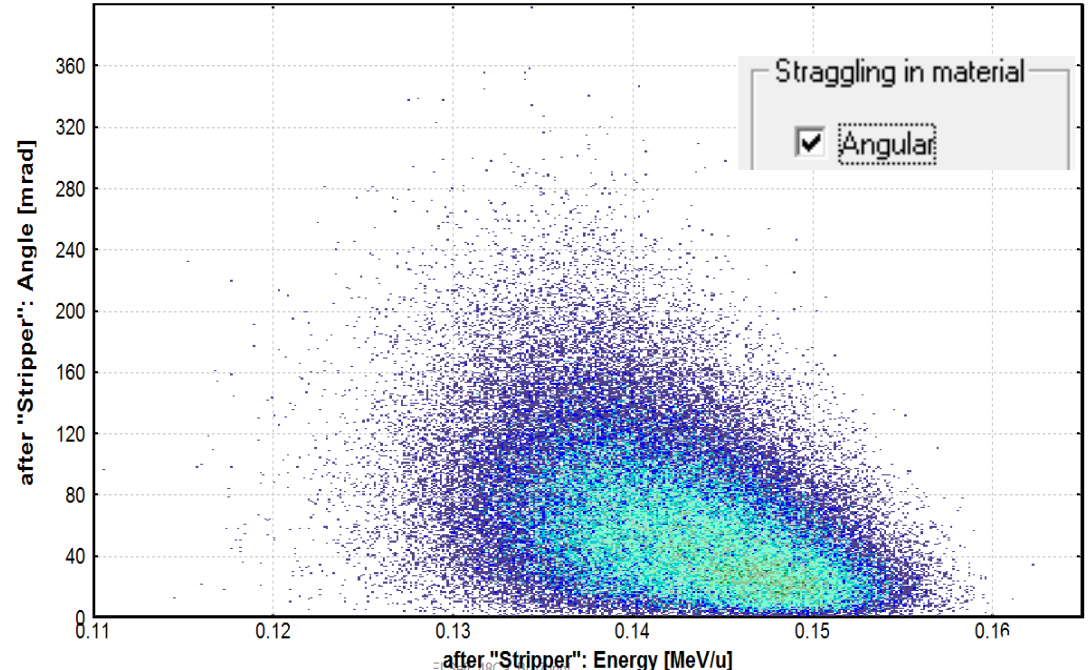
Primary beam (^{48}Ca)

Very low energy

Straggling in material
 Angular



Straggling in material
 Angular



Setting ions ($^{255}\text{Lr}^{**+}$)

