Exercise: Heavy ions beams

20th FLUKA Beginner's Course

Stellenbosch University

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Exercise: Heavy Ions beams

Aim of the exercise:

1- Use of heavy ions beams

2- Use of USRYIELD detector

3- Compile custom executable

Exercise: Heavy Ions beams

❑ Start from the solution of ex_Geo1 (Copy both .inp and .flair files).:
   mkdir ex_HeavyIons
    cp ex_Geo1/ex_Geo1_final.inp ex_HeavyIons/ex_HeavyIons.inp
    cd ex_HeavyIons

❑ Replace the proton beam with a 400 MeV/u oxygen beam

❑ Divide INAIR Region into two Regions:
    i) before and around the target
   ii) after the target

❑ Swap water and lead material assignment (to save CPU time)

❑ Add 2 PHYSICS cards to activate Coalescence and Evaporation of
        heavy ions

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❑ Score the charge spectrum of ions (3 ≤ Z ≤ 9) at the boundaries: Lead-Aluminum, Aluminum-Water, Water-CO2

Add 3 USRYIELD detectors (unformatted unit 68) with:

1st quantity: particle charge (from 2.5 to 9.5)

2nd quantity: polar lab angle (from 0 to 90 degrees)

❑ Score the Linear Energy Transfer spectrum of ions (3 ≤ Z ≤ 9) and of all charged particles (-2 ≤ Z ≤ 9) at the end of the target

Add 2 USRYIELD detectors (unformatted unit 69) with:

1st quantity: Linear Energy Transfer (from 0.0 to 100.0 keV/(µm g/cm³)

2nd quantity: particle charge

Warning: use the appropriate normalization factor

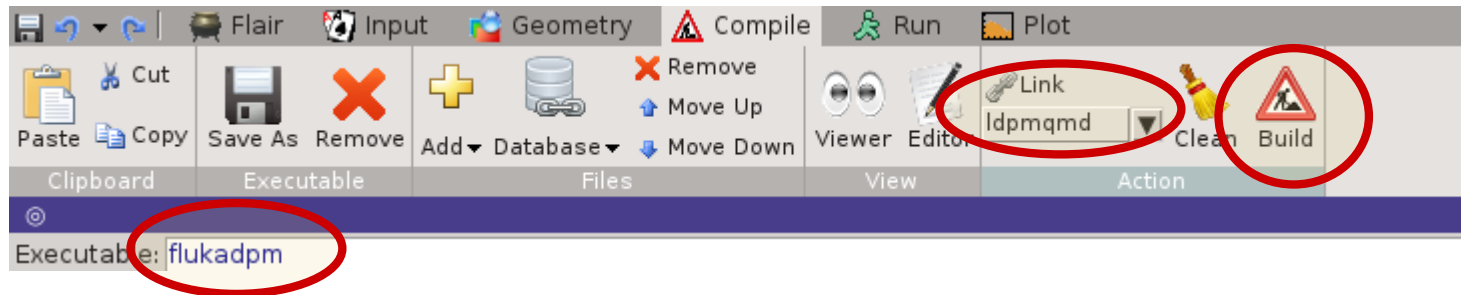*for logarithmic scoring, score from 0.001 to 100.001 keV/(µm g/cm³)*

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❑ **REMINDER**:

In order to run with ions at energies above 125 MeV/n, user should

link **dpmjet** and **rqmd**
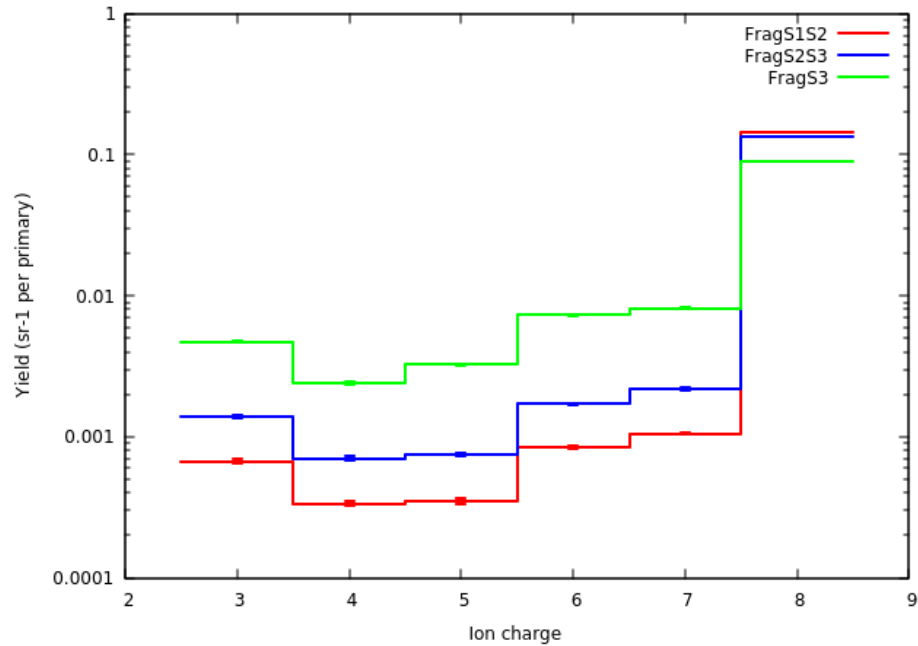
$FLUPRO/flutil/**ldpmqmd**

(or alternatively in Flair)

to produce a custom executable.

❑ Run 4 cycles x 500 primaries

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Plot the results: