



Exercise 11: Heavy ions beams

Beginners' FLUKA Course

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 **ex4** (Copy both .inp and .flair files).:

```
mkdir ex11 ; cp ex4/ex.* ex11 ; cd ex11
```
- ❑ Replace the proton beam with an oxygen beam
having same energy per nucleon
- ❑ Swap water and lead material assignment (to save CPU time)

Exercise 12: Heavy Ions Beams

- Score the charge spectrum of ions ($Z \geq 3$) at the boundaries: Lead-Aluminum, Aluminum-Water, Water-CO2

Define a dummy cylindrical region 1 micron thick

between $z=9.9999\text{cm}$ and $z=10\text{cm}$

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 (in water) of ions ($Z \geq 3$) and charged particles at the end of the target

Add 2 USRYIELD detectors (unformatted unit 69) with:

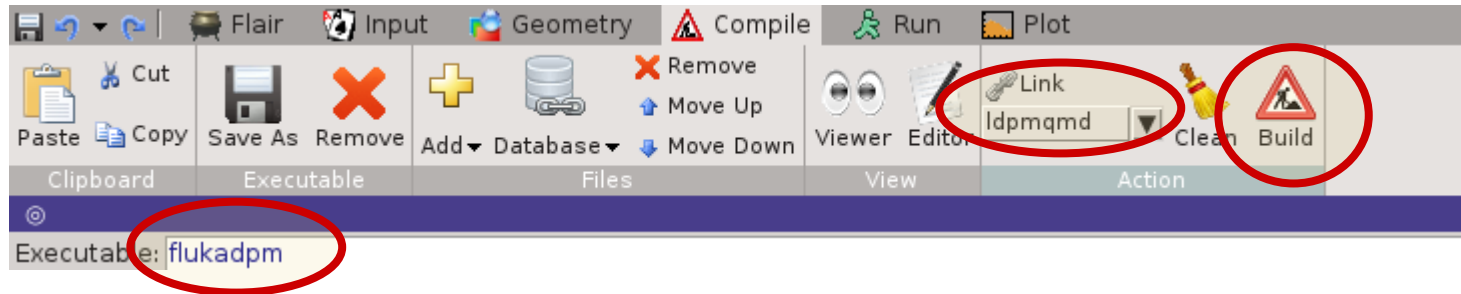
1st quantity: Linear Energy Transfer (from 0.0 to 20.0)

[given in $\text{keV}/(\mu\text{m g}/\text{cm}^3)$]

2nd quantity: particle charge (from 2.5 to 9.5)

Exercise 12: Heavy Ions Beams

- In order to run with ions user should link **dpmjet** and **rqmd** (`$FLUPRO/fluti1/1dpmqmd`) to produce a custom executable



- Run 4 cycles x 500 primaries