# Exercise 12: Heavy ions beams

Beginners' FLUKA Course

# Exercise 12: Heavy Ions beams

**Aim of the exercise:**

1- Use of heavy ions beams

2- Use of USRYIELD detector

3- Compile custom executable

# Exercise 12: Heavy Ions Beams

- Start from the solution of ex5 (copy both inp and flair files):
  mkdir ex12 ; cp ex5/ex5.inp ex12/ ; cp ex5/ex5.flair ex12/ex12.flair ; cd ex12
- 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≥3) at the boundaries: Lead-Aluminum, Aluminum-Water, Water-CO2

  *Define a dummy cylindrical region 1 micron thick*

  *between z=9.9999cm and z=10cm*

  *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≥3) and charged particles at the end of the target

  *Add 2 USRYIELD detectors (unformatted unit 69) with:*

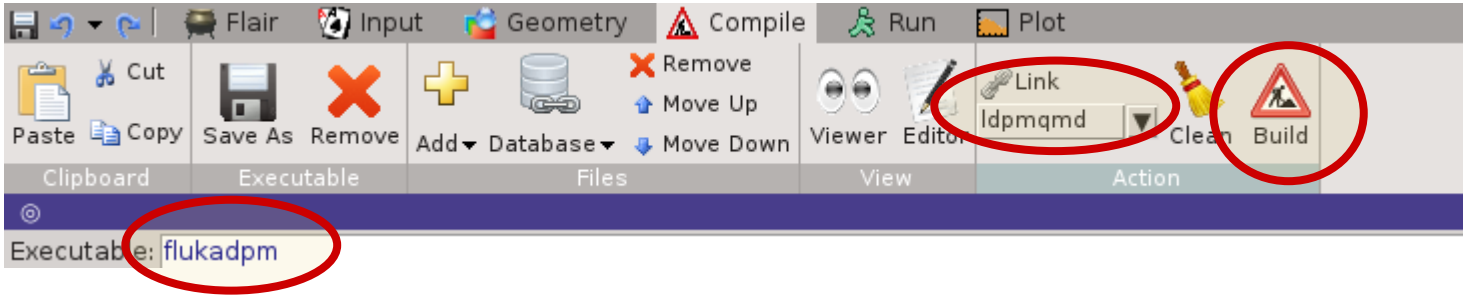
  *1st quantity: Linear Energy Transfer (from 0.0 to 20.0)*

  *[given in keV/(μm g/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 compile linking **dpmjet** (`$FLUPRO/flutils/`**`ldpmqmd`**) to produce a custom executable




- Run 4 cycles x 500 primaries