



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.* ex12/. ; 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 ($Z \geq 3$) 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 90) 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 89) with:

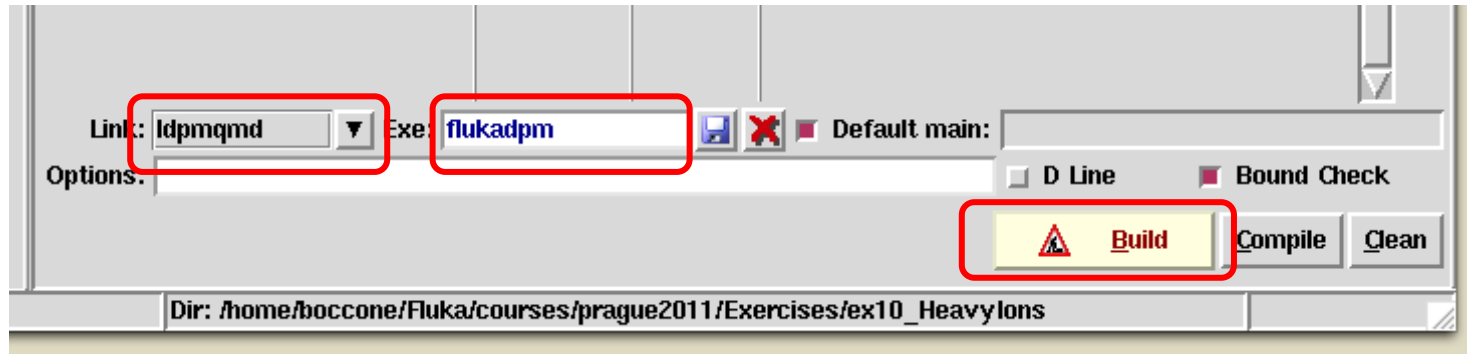
1st quantity: Linear Energy Transfer (from 0.0 to 20.0)

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

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

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- 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