



Exercise: Materials

FLUKA Beginner's Course

Exercise: Materials

Aim of the exercise:

- 1- Learn how to assign material to an object
- 2- Learn how to define your own materials
- 3- Learn how to change the input file with FLAIR

Exercise: Materials

Copy the input file from the example_score in a new directory:

```
mkdir ex_Materials ;  
cp ../Examples/example_running/example_running.inp ex_Materials/ex_Materials.inp;  
cd ex_Materials
```

Open the file `ex_Materials.inp` with FLAIR (`flair ex_Materials`) to edit the input file and...

- ❑ add two compound materials: BEER and CO₂
- ❑ assign respectively to target (TARGET) and surrounding region (VOID)

Tip I: use predefined FLUKA materials as components

Tip II: ETHANOL is a compound material too (density: 0.789 g/cm³)

- BEER composition (MASS content):
90 % WATER , 10 % ETHANOL (CH₃CH₂OH)
- BEER density: 1 g/cm³
- CO₂ density: 0.001965 g/cm³

Run `ex_Materials.inp` from the terminal with 5000 primaries:

```
$FLUPRO/flutil/rfluka -N0 -M3 ex_Materials
```

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Compare with the previous example (example_running directory):

- ❑ The energy deposited into the target and the region around it
- ❑ The probability that a primary proton undergoes an inelastic collision (BEAMPART Star Density in the .out file)

Look inside the input file and using FLAIR:

- ❑ assign the change momentum to the proton beam (4.34 GeV/c)
- ❑ modify the beam angular divergence to a FLAT distribution
- ❑ change the name of a body in the geometry

See how the input file changes.