



Exercise 12: Voxels

Beginners' FLUKA Course

Exercise 12: Voxels

- Create a folder called ex12 and download
 - download the solution of **ex5.inp** from the website
 - rename it to **ex12.inp**
 - download the **ct.vxl** file
 - and open the ex12.inp in *flair*
- In the geometry after the GEOBEGIN and before the first body add a **VOXEL** card at location **[-2, -3, 1.5]** with Filename: **ct**
- The ct.vxl contains **7 organs** and has **20×20×20 bins** of **size [0.2, 0.3, 0.4] cm³** respectively
- Modify the regions of the target segments to remove the VOXEL body
- Assign **VACUUM** to **VOXEL001** and any *material of your choice* to the other voxel organ regions with several **ASSIGNMA** cards
- Display the egg-shaped geometry (Y-Z and X-Y cuts)
Note that some boundary lines disappear (due to alignment of the projection plane with the voxel sides)! Move the origin by a tiny amount to redisplay the boundaries

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- Add a USRBIN card scoring ENERGY with a Cartesian mesh from [-5,-5,-5] to [5,5,15] with [100×100×100] bins
- Run FLUKA for 1000 primary protons
- Display the USRBIN results in as Energy Deposition (GeV/cm³)
 - ZX @ x=0 cm for y in [-0.6, 0.6]
 - XY at z=5 cm for z in [-4.5, 5.5]
- and in a 1-dimensional profile along the Z axis. You can average your results over the whole Y range.

For the daring:

- Compile **writect.f** (from flair or the command line)
- Execute the **writect** program to create the **ct.vxl** file
- Try to understand the correspondence *HU* ↔ *organs* ↔ *regions* written on the standard output, it is the same example presented in the lecture)
- Use the **CORRFACT** card to impose a density scaling factor for charged particle ionisation processes: 1.4 for VOXEL006 and 0.8 for VOXEL005