Advanced geometry exercise

Advanced geometry exercise

Practice with translations and rotations in Fluka

- **`$start_translat`**
- **`$start_transform`**
- **`ROT-DEFI`**
- **`ROTPRBIN`**
- Good practice in element modeling

Advanced geometry exercise

Geometry construction

- Start from the given input file
- Notice that all the geometry elements are there:

  1 exp. hall, 1 exp. chamber, 1 collimator, 1 image plate detector

  (if you don’t see them, look in the origin and on different views)
- Move the experimental chamber within the experimental hall
- Move the collimator and the image plate within the exp. Chamber

  (details on the next slide)
- Notice the use of Bounding Boxes in the definition of the elements

Advanced geometry exercise

Geometry construction and scoring

- Translate Exp. Chamber bodies by Δx=2500 cm, Δy=80 cm, Δz=2400 cm
- Translate Image plate bodies by Δx=2550 cm, Δy=110 cm, Δz=2470 cm
- Transform Collimator bodies using 2 ROT-DEFI cards:

  1-Rotation around Y-axis by 2° (inside an “ **`#if`** / **`#endif`** ”)

  2-Translation by Δx=2550 cm, Δy=110 cm, Δz=2450 cm
- Score the energy deposition on the collimator

  The USRBIN card is there already

  The ROTPRBIN card needs to be filled

Advanced geometry exercise

Running the simulations and looking at the results

- For the case with the rotation, run 5000 primaries (use cycles and spawns)
- Merge the results
- Adapt the already available layers in the Geometry editor
- Look at the particle fluences for the two cases

  x-z plane over the whole geometry

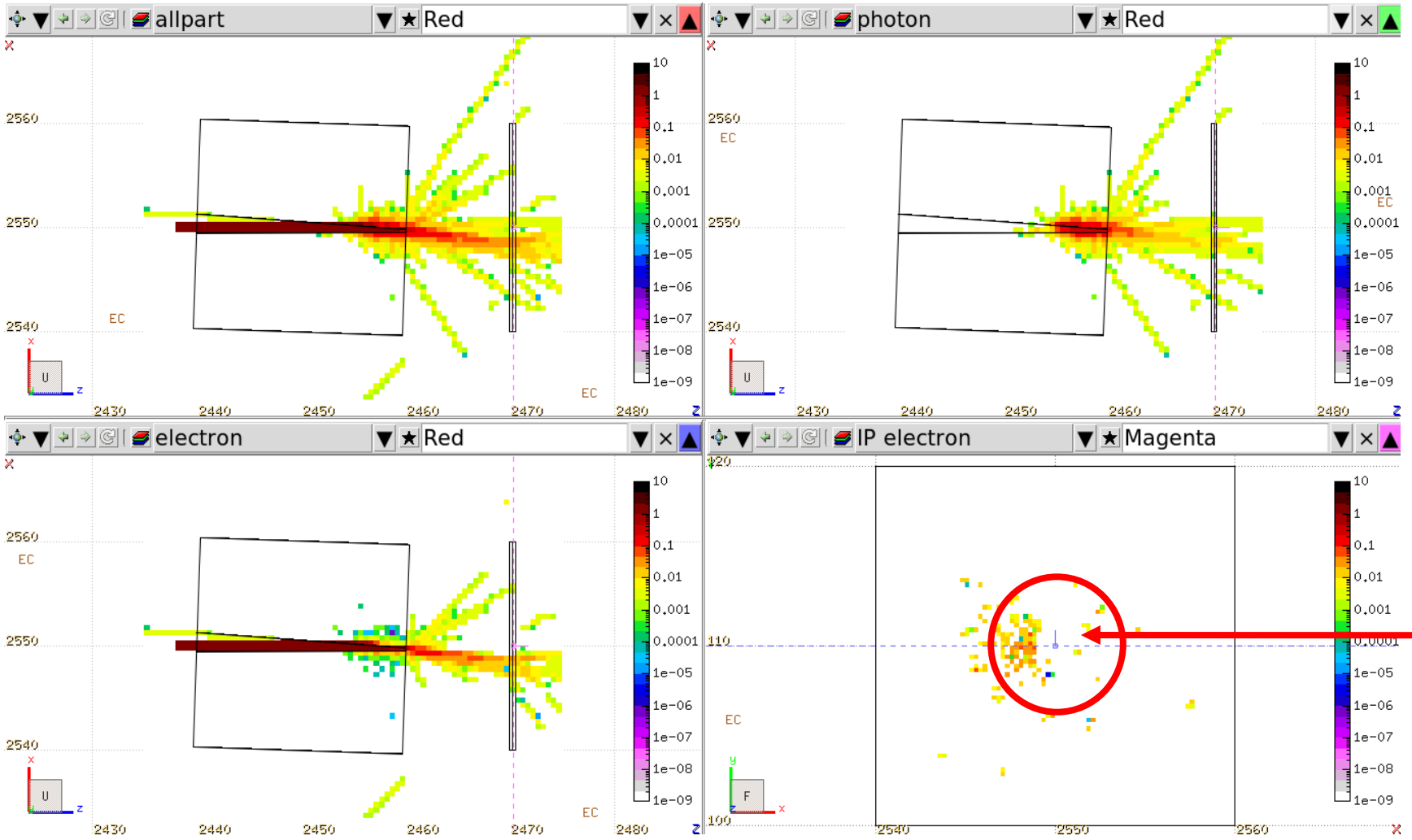
  z-y plane over the image plate
- Look at the scoring of the energy deposition on the collimator
- In the geometry editor, try to add a layer to visualize

  the rotated USRBIN mesh from the input file

  (i.e. just the mesh definition, not result simulation results)

Advanced geometry exercise

Particle fluence with tilted collimator



The electron beam does not hit the center of the Image Plate

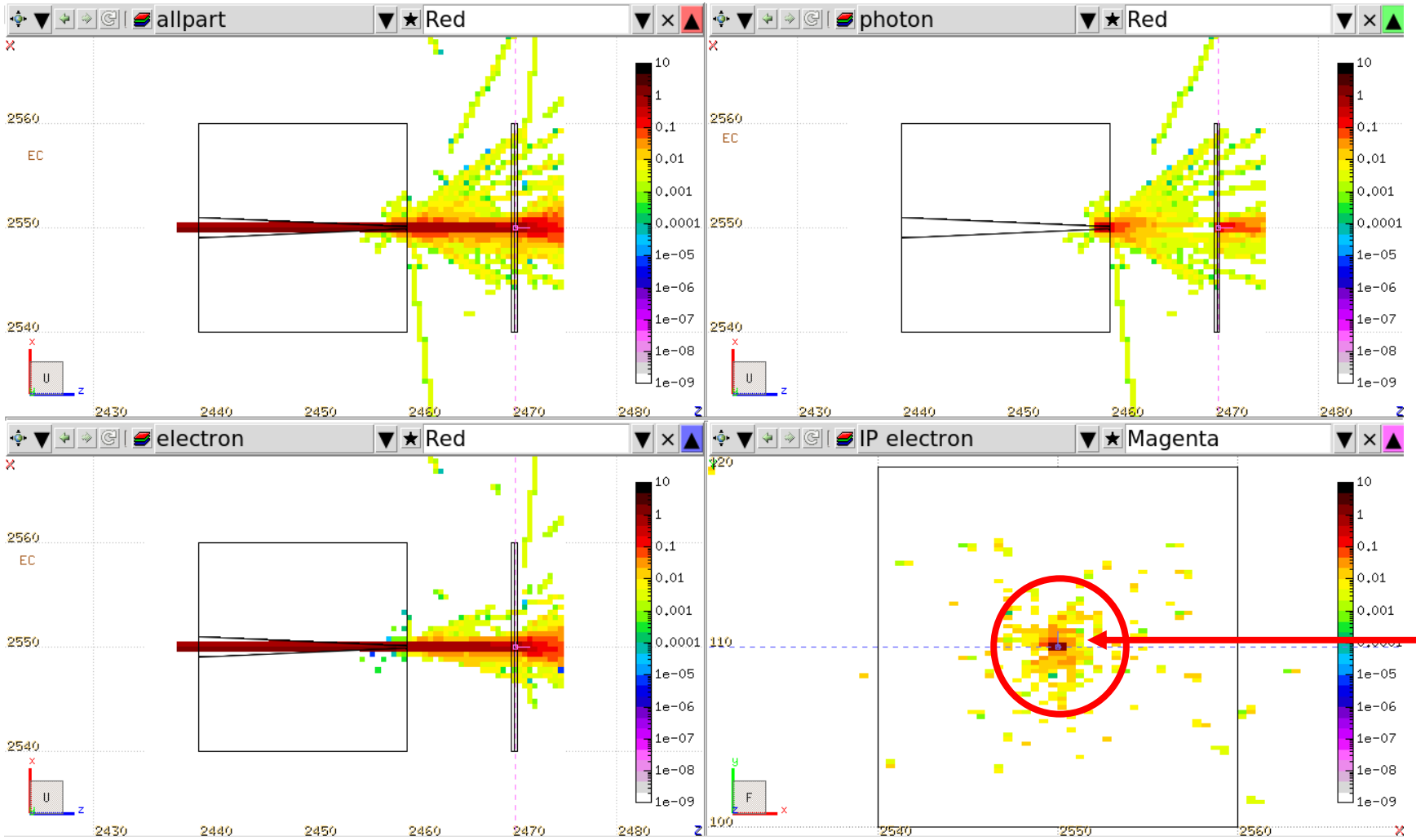
Advanced geometry exercise

Extra: Particle fluence with straight collimator

- Only if you have time to spare…
- Disable the collimator rotation using the preprocessor instruction
- Run with the collimator aligned
- Compare the results (impinging point on the Image Plate)

Advanced geometry exercise

Extra: Particle fluence with straight collimator



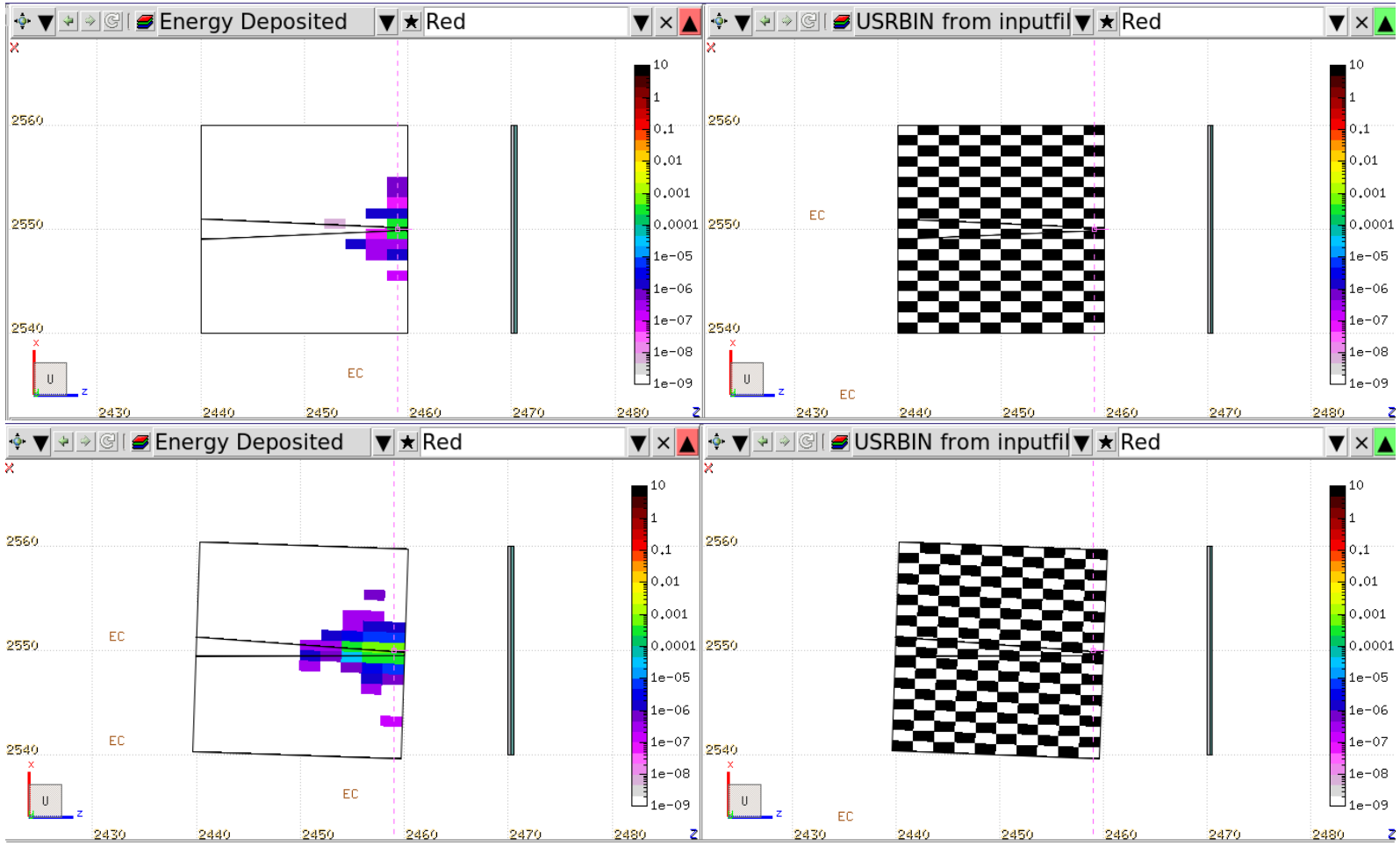
The electron beam hits the center of the Image Plate

Advanced geometry exercise

Energy deposition

Without collimator rotation

With collimator rotation




FLUKA