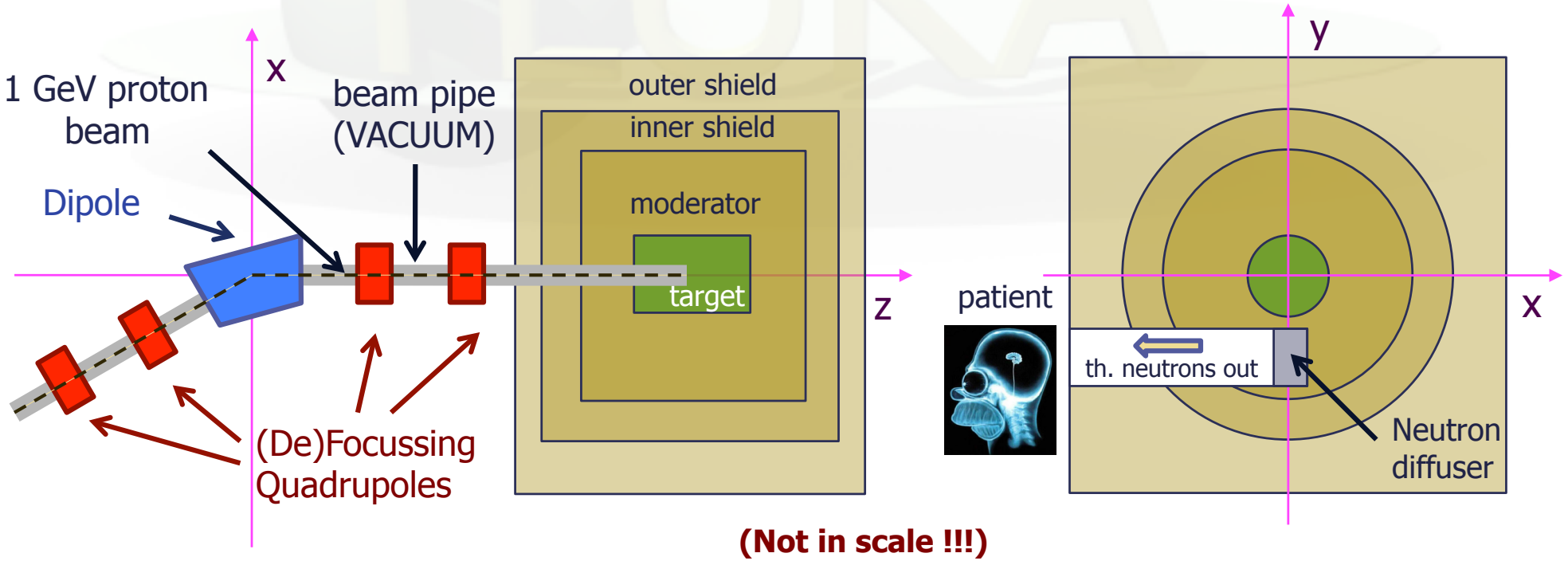
Fluka Exercise

Hands on Fluka

Introduction to the exercises

- Topic of the exercises: Fluka simulation of a very simplified accelerator based Boron neutron capture therapy (BNCT) facility;
- Try to embed the new features of Fluka (see lectures);
- Modular approach: solutions are given after each exercise session, and can be used as starting point for the next exercise;



(Not in scale !!!)

Ex01 – Basic geometry

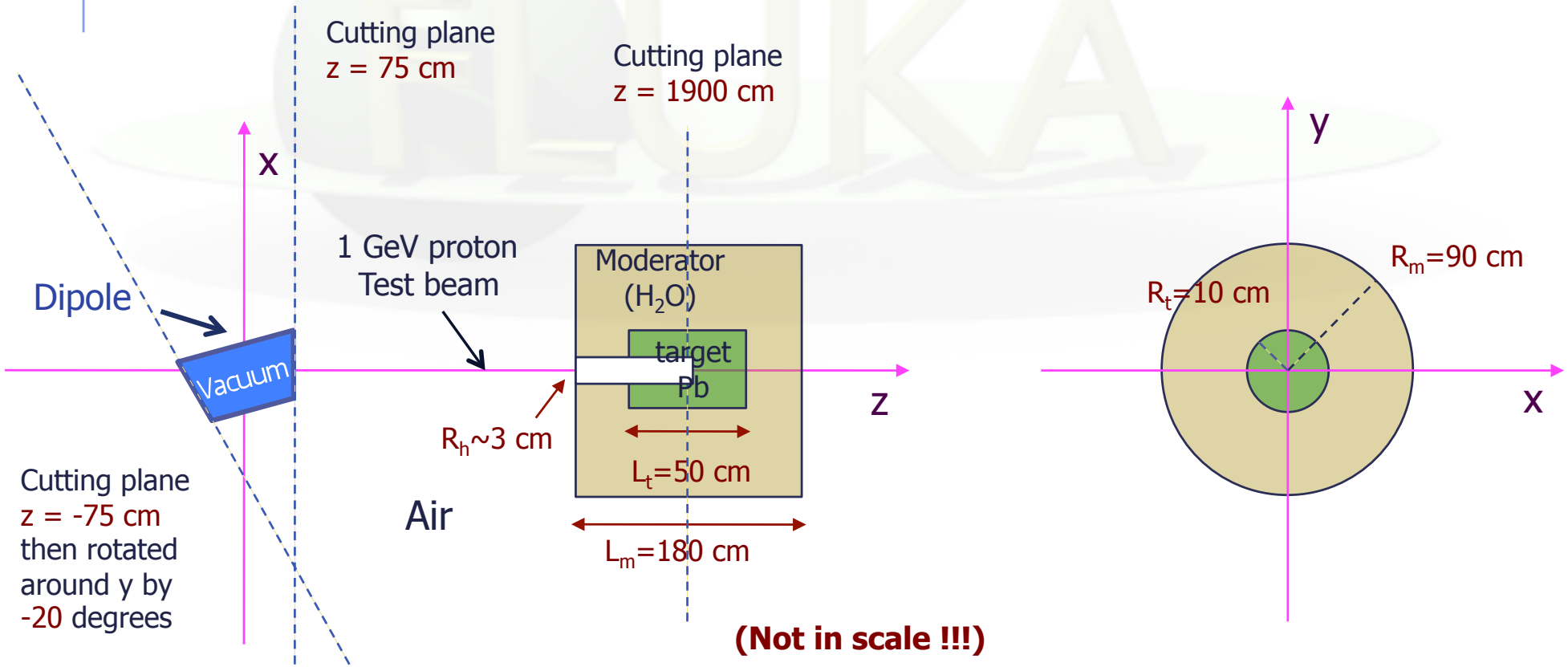
- GOAL: make yourself confident with the Flair interface and its new features and learn the debugging art;
- Recipe:
  - Open the input file with flair:

    ex01-BasicGeometry/flex_00.inp
  - Find the mistakes (geometry errors, undefined regions or missing materials definitions);
  - Fix them.

Ex01 – Basic geometry

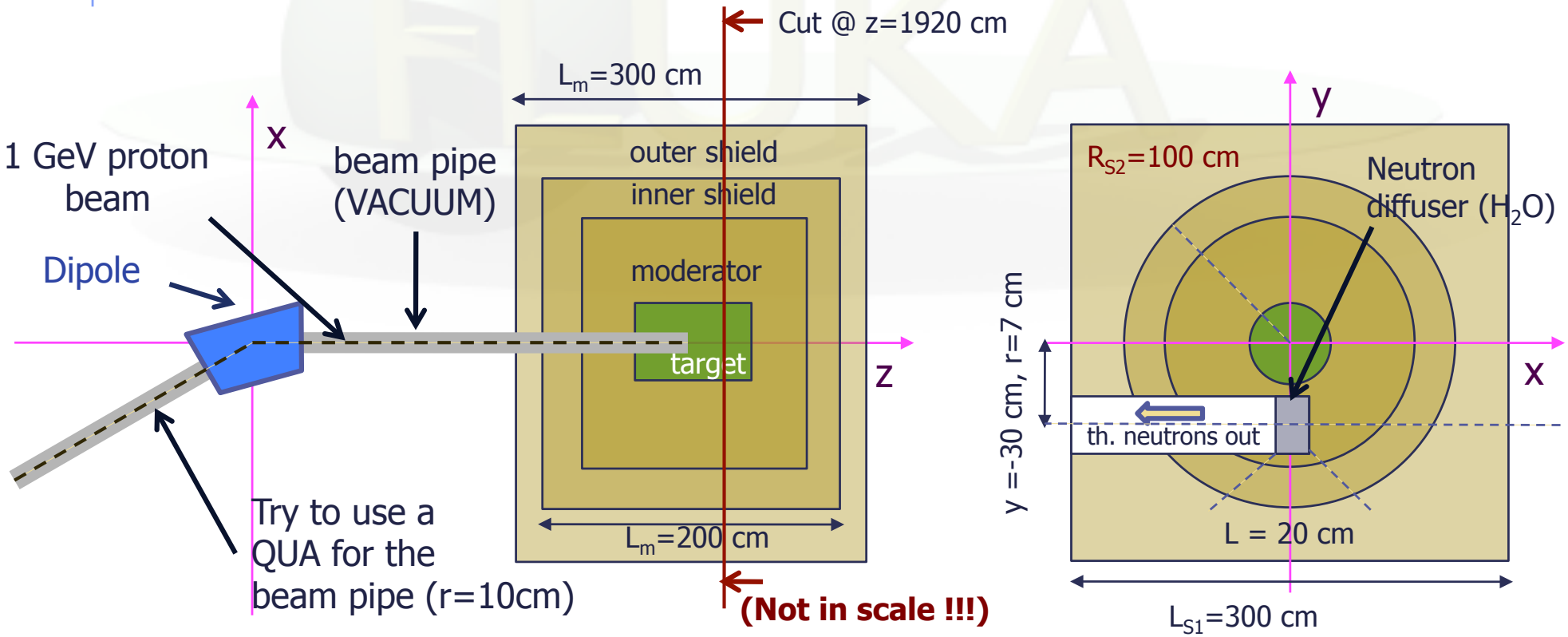
A couple of F.A.Q.:

- Q: Particles disappear in the moderator…why? A: Which material did you use for neutron moderation?
- Q: The simulation might run but… Check the output (*.out) file and/or the Fluka error files (*.err);



Ex02 – Geometry

- GOAL: work the setup geometry (w/o quadrupoles and phantom - see lattice and VOXEL exercise);
- Create a new directory ex02-Geometry and copy there the flex_01.inp solution;
- Replace the rotated bodies by a XYP and a ZCC and apply them the suitable transformation (use the geometrical directives);
- Add the two target shields (outer RPP, inner ZCC);
- Build the neutron extraction line and the neutron diffuser (with RCCs);



Ex02 – Geometry

- Build the two proton beam pipes before and after the dipole. Use the QUA and the geometrical directives for the part before the dipole;
- Add USRBIN cards to score ENERGY and NEUTRON fluence on the target station;
- Check the energy spectrum of the produced neutron "beam" at different locations along the extraction line (by using USRDBX between two adjacent regions, i.e. target ->moderator, moderator->diffuser, etc…).
- If you have time place a constant magnet field in the dipole.