LUXE Background Study in Simulation

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LUXE Meeting
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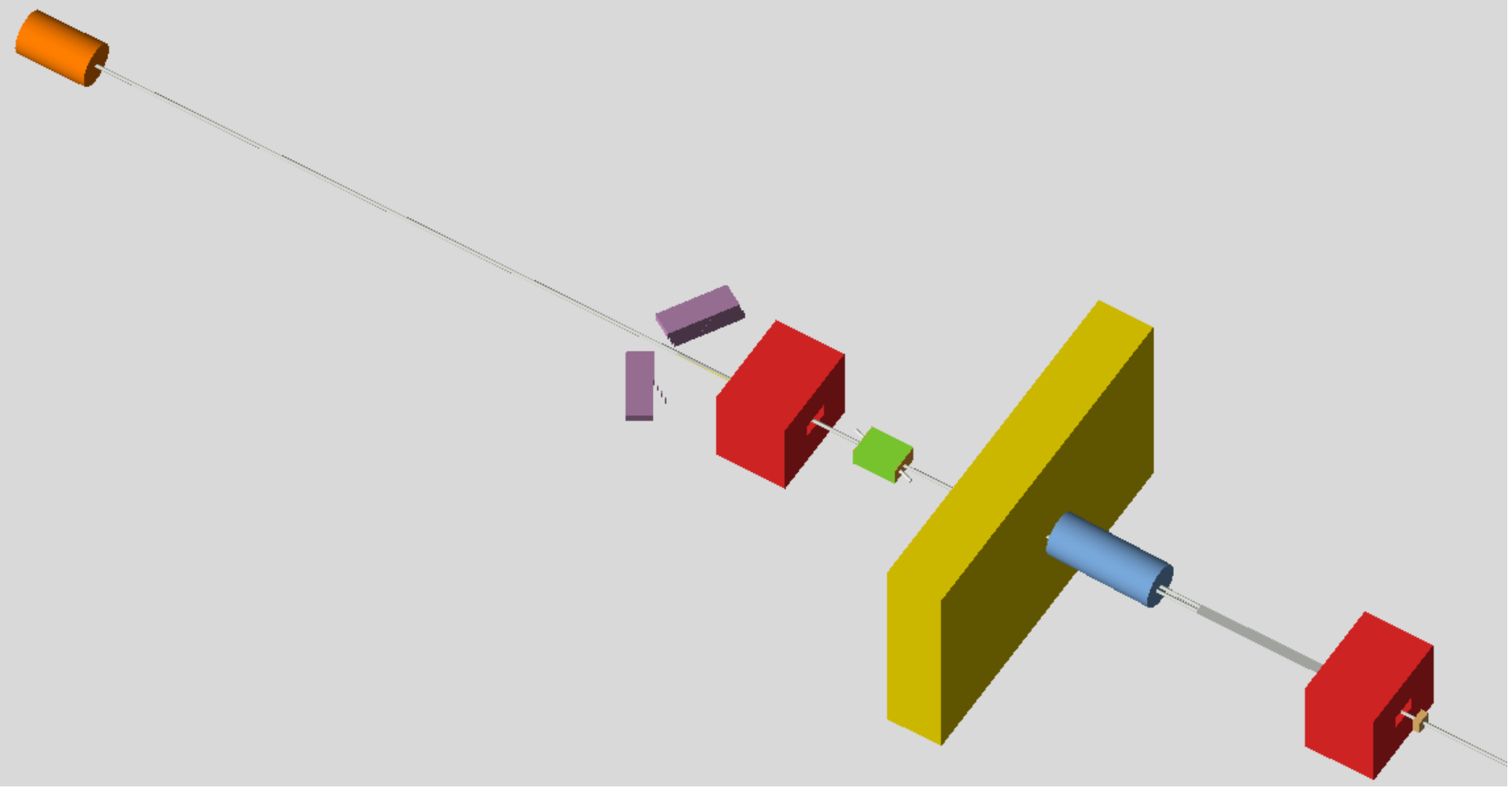
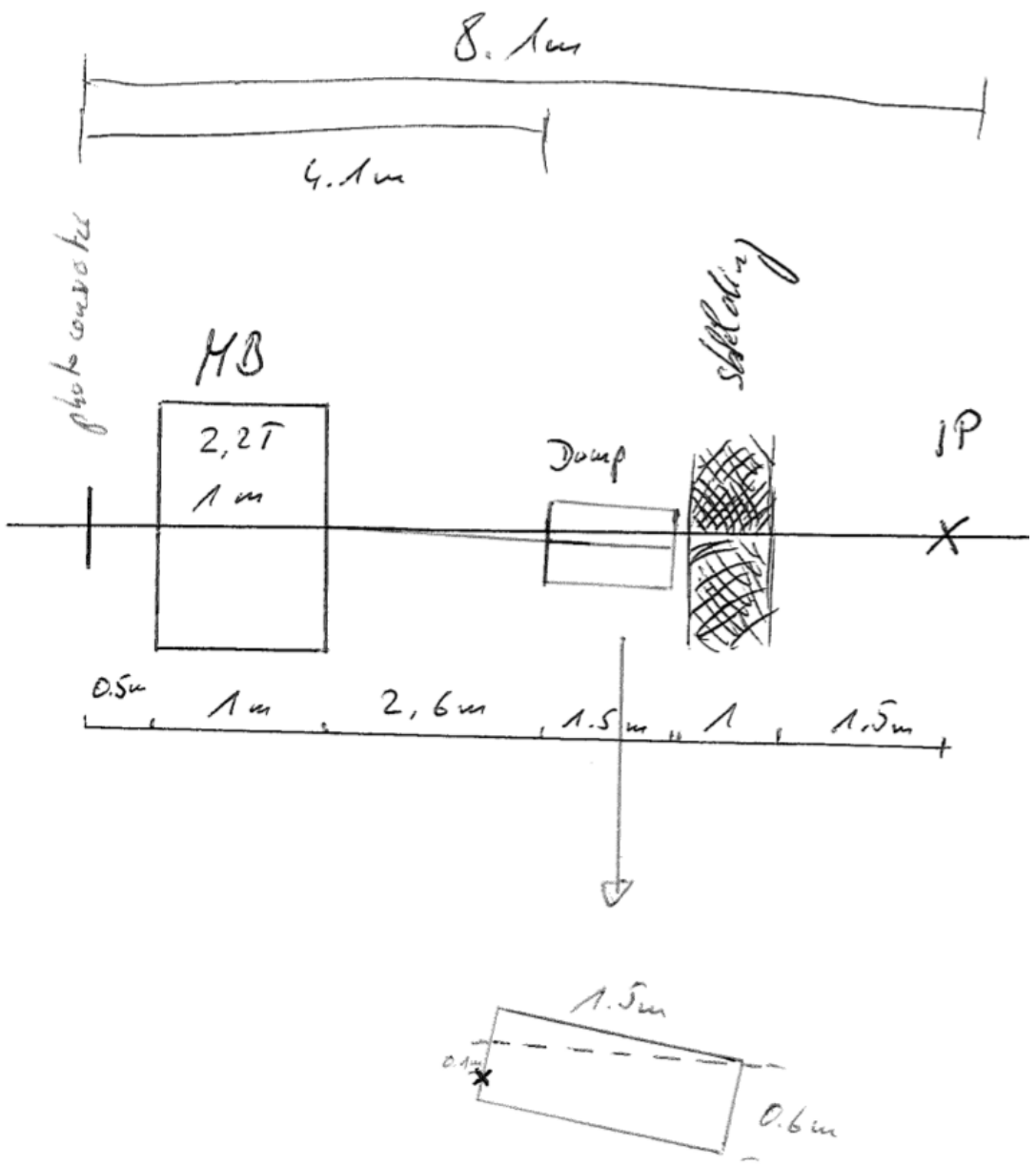
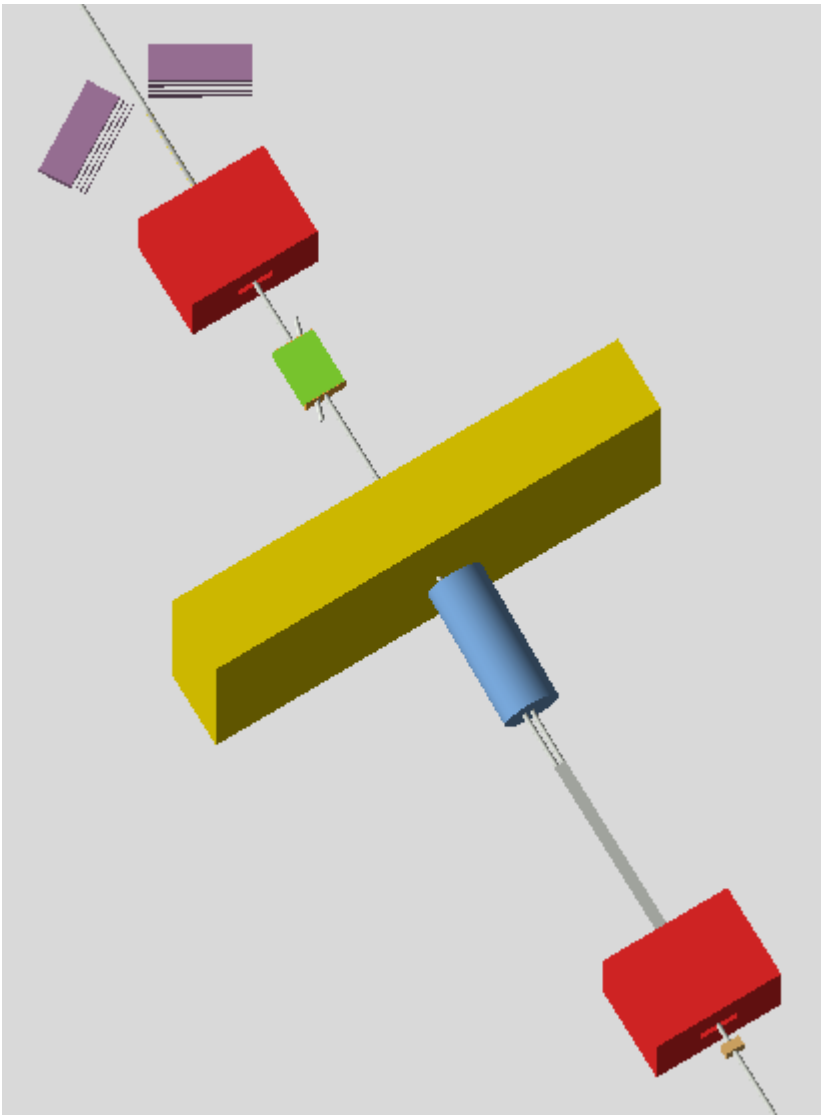
LUXE geometry in Geant4

- Check background in OPPP detectors: trackers and calorimeters;
- Optimize detectors position, shielding, beam pipes and windows;
- Establish a benchmark in a simple geometry for comparison with more detailed implementation.

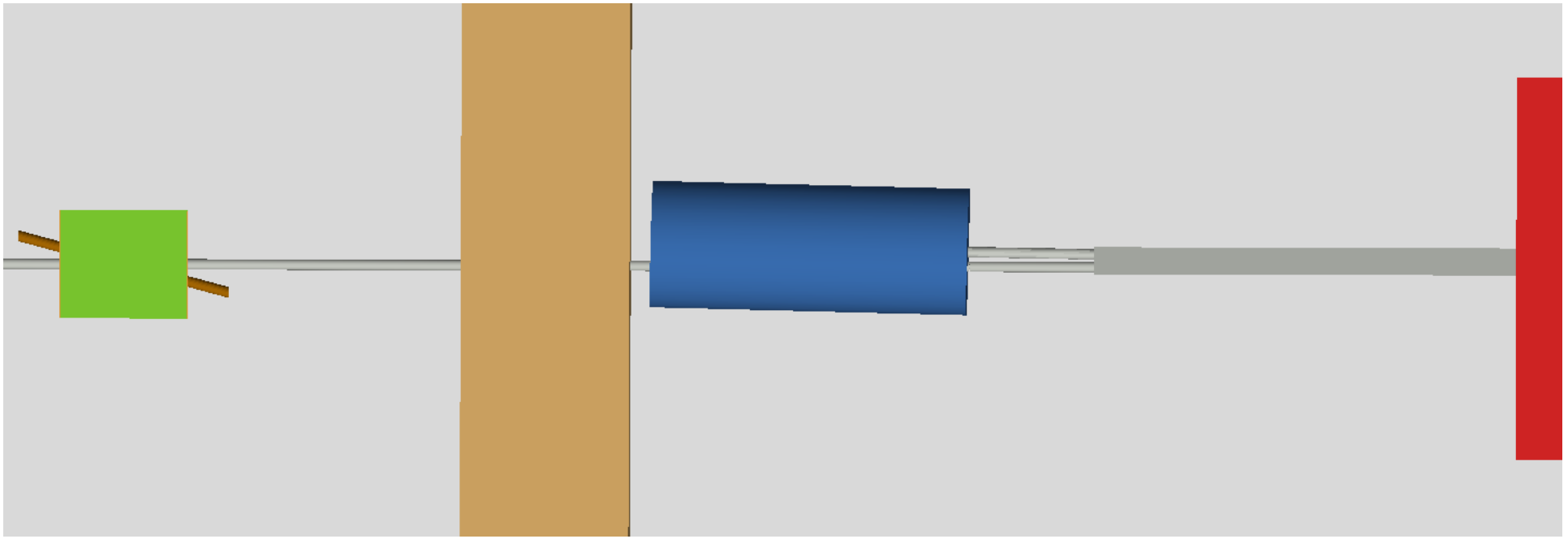


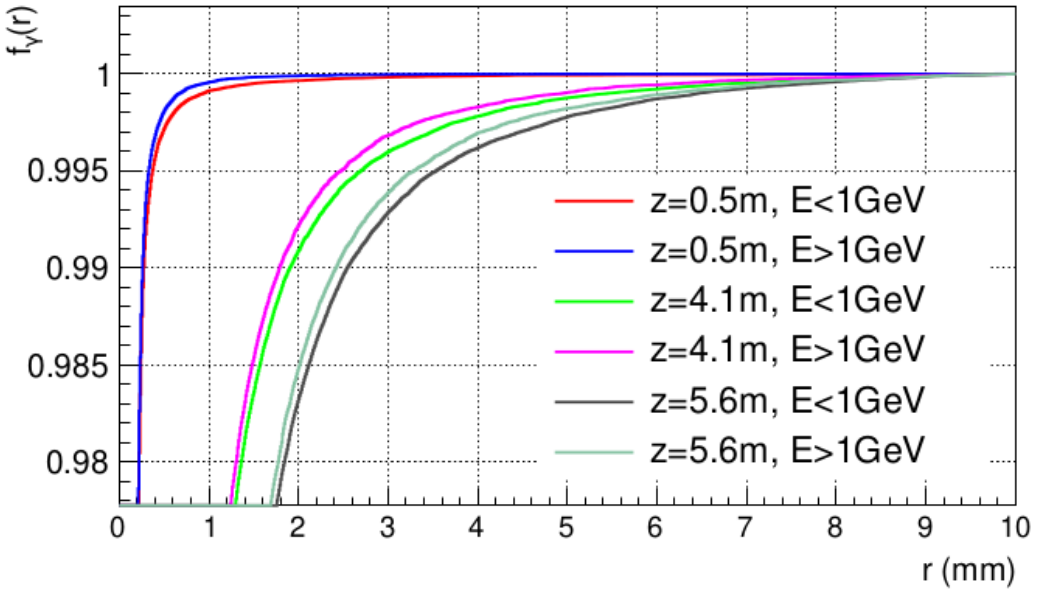
Sketch and Geant4



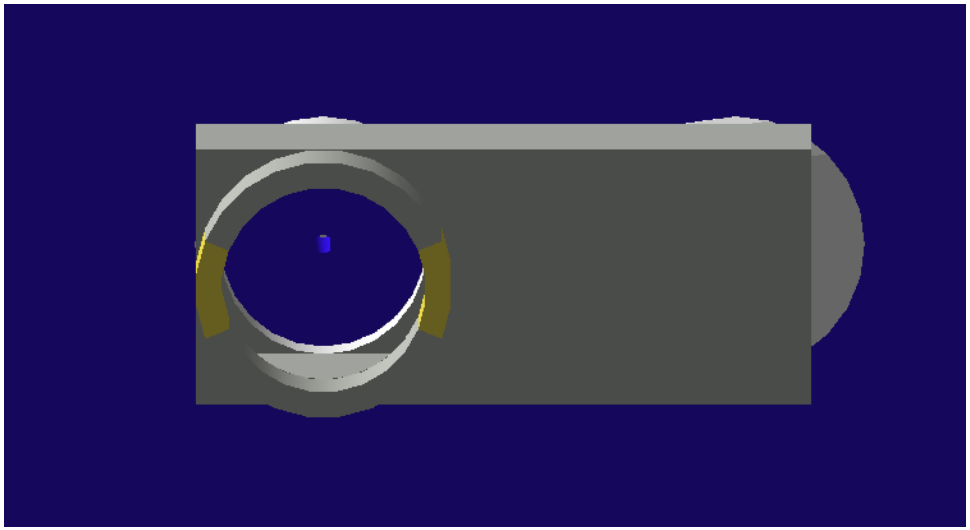


Beam Dump with Hole for Photons



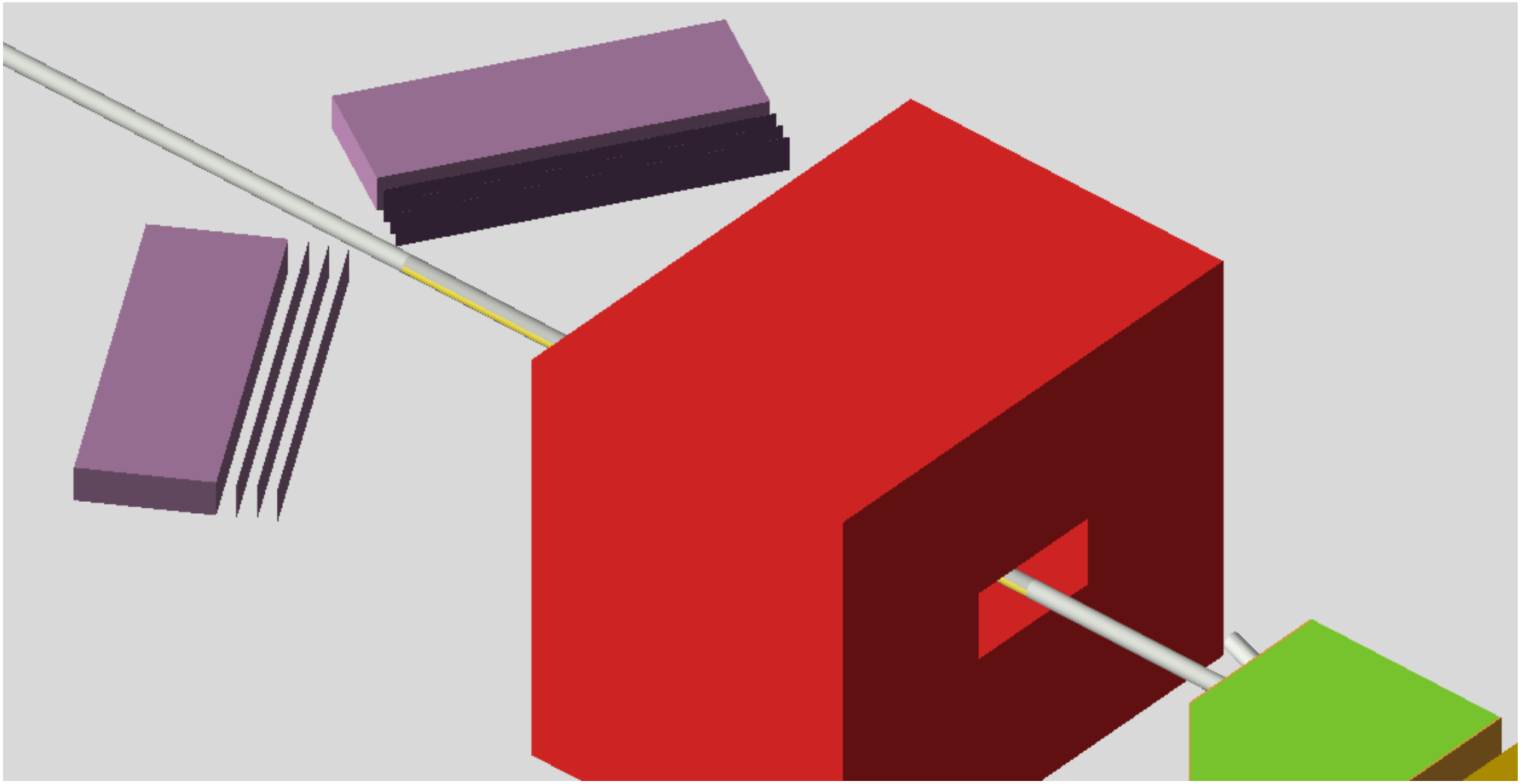


Fraction of photons inside the circle as a function of its radius for different distances from the target

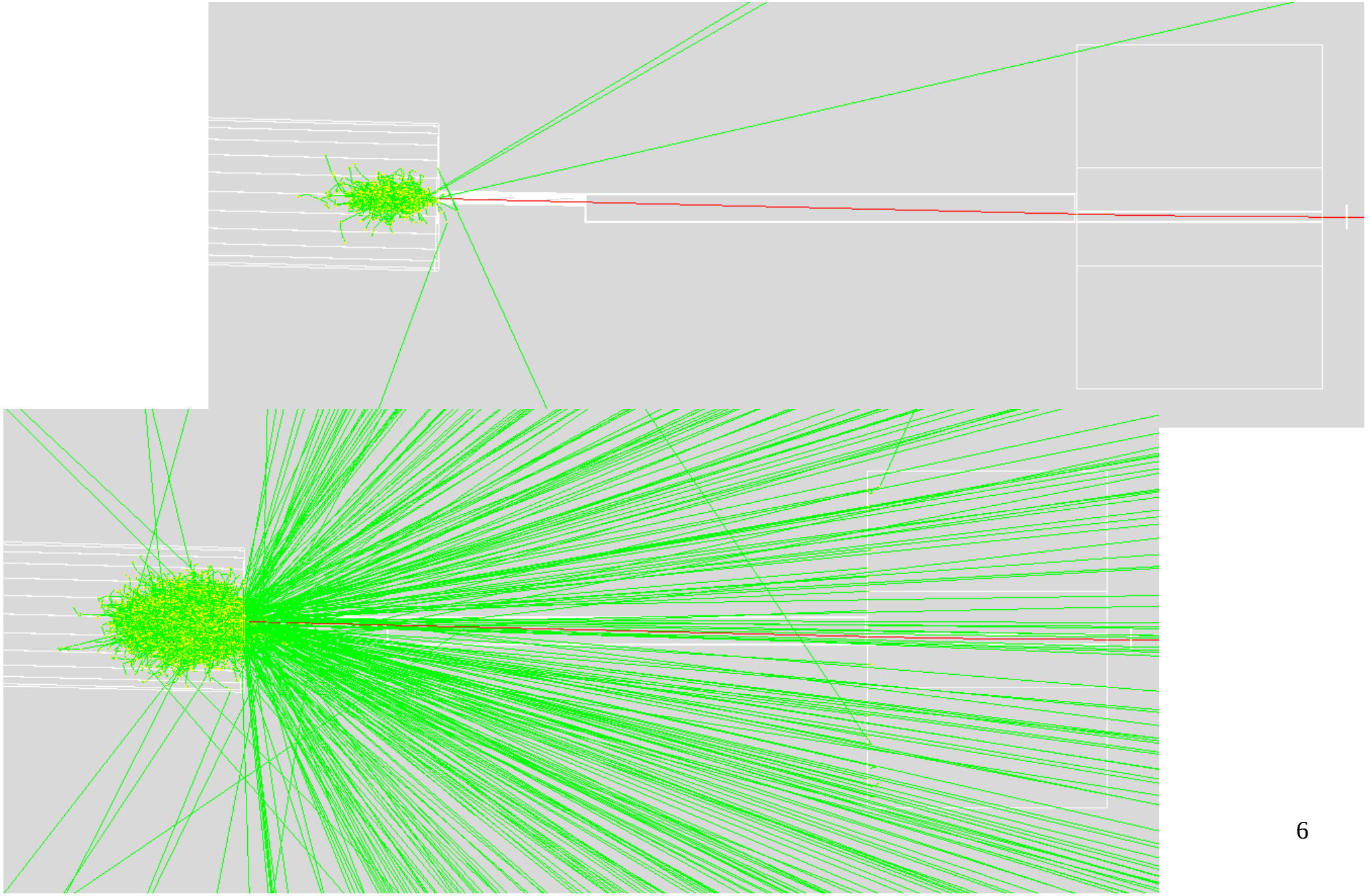


Front view of the beam dump through the beam pipe

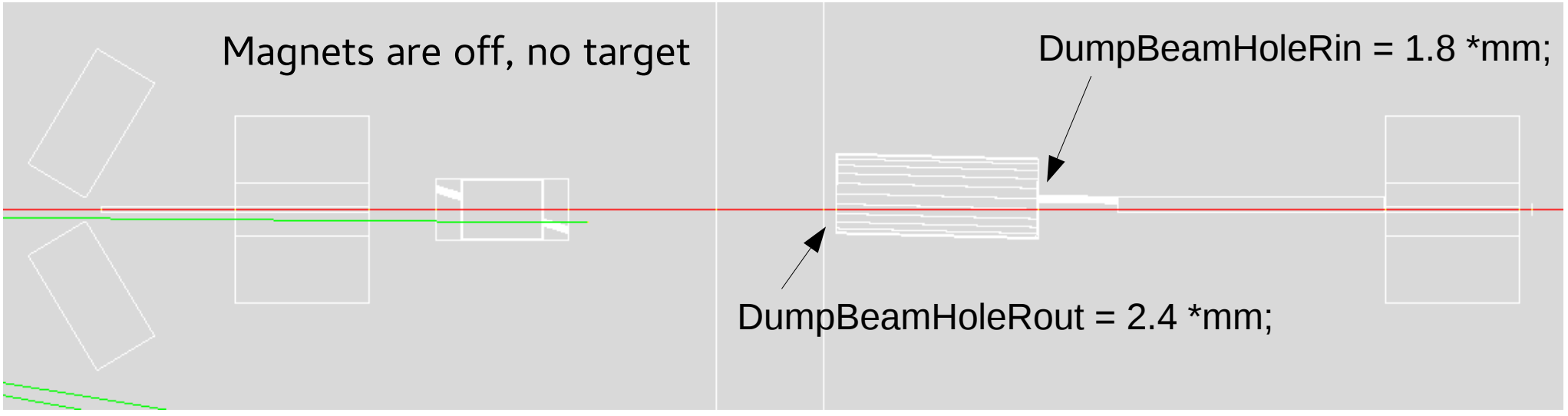
Tracking Planes

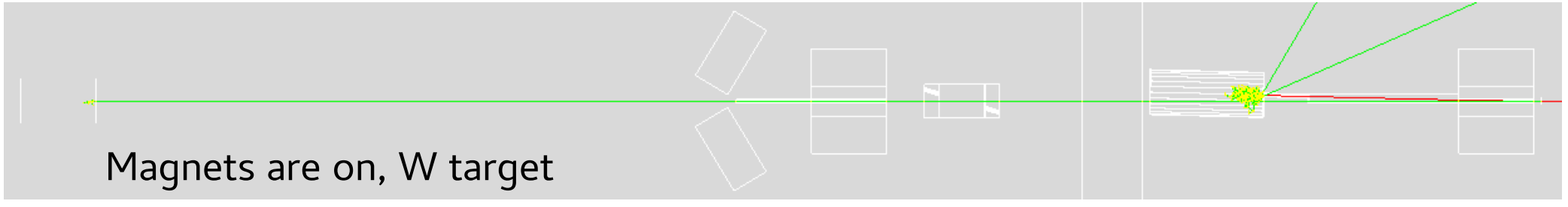


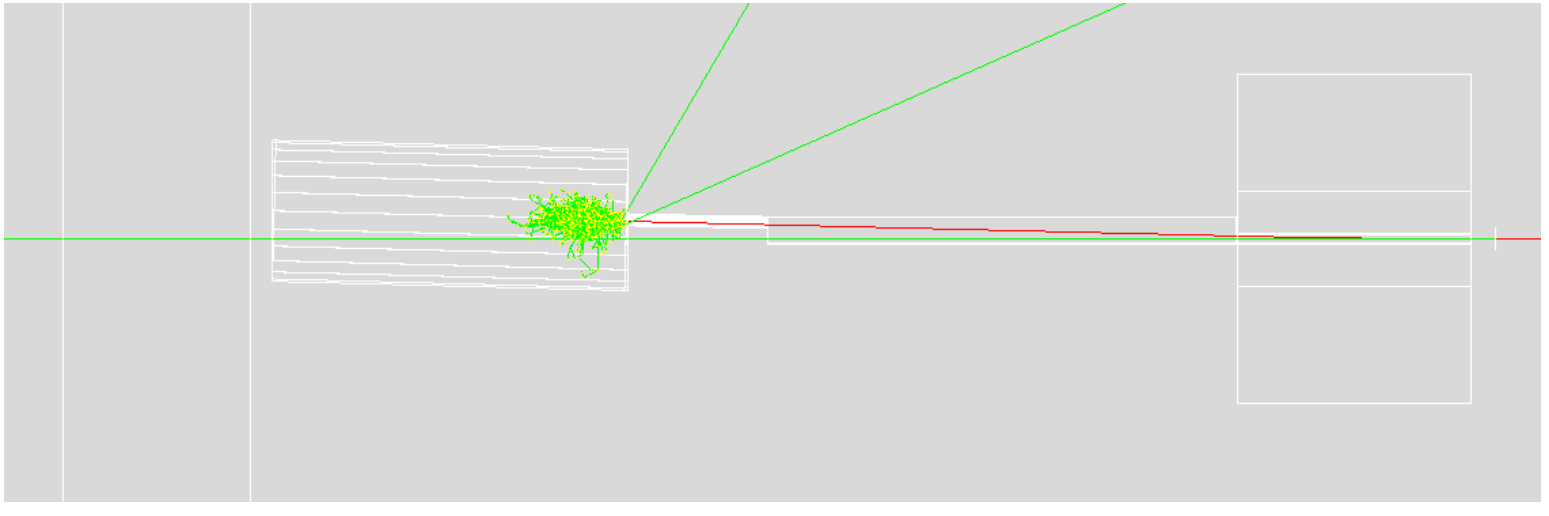
No Target, 1.4 T



Performance with test settings





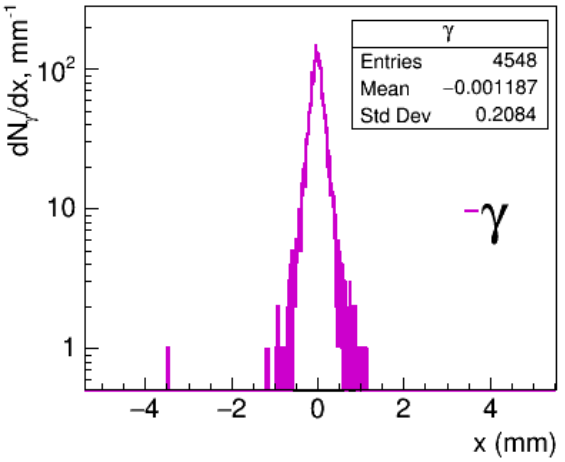


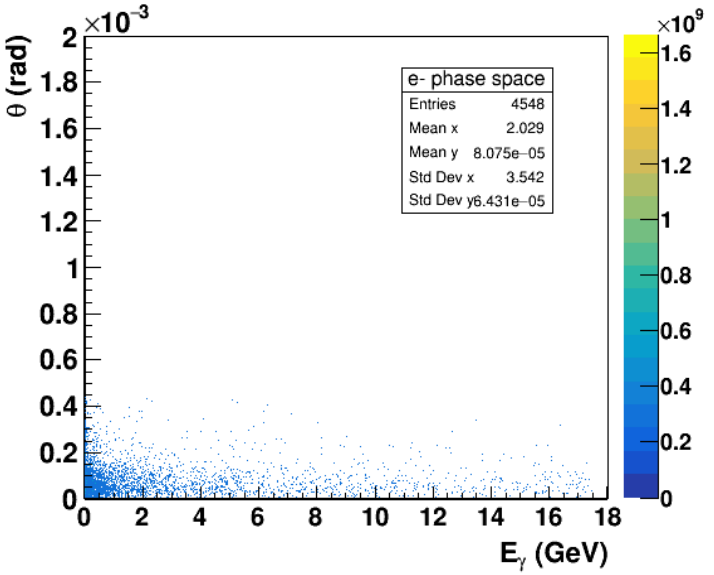
50k e-

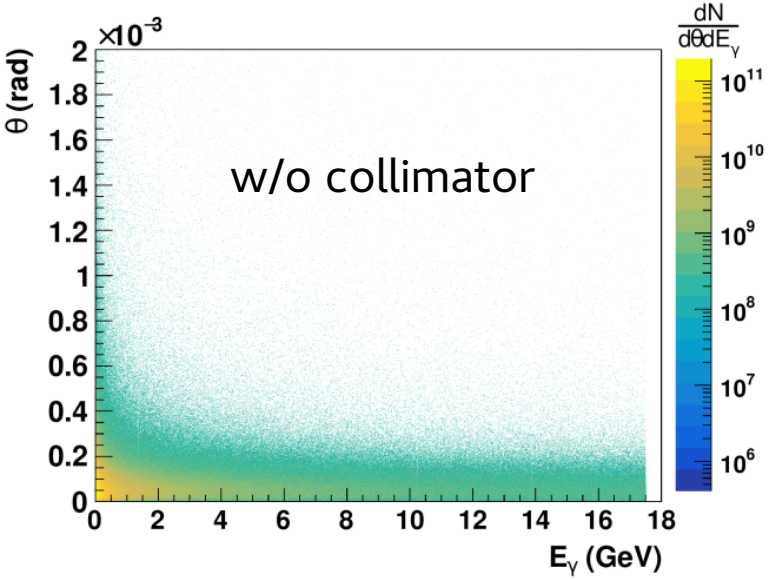
Simulated 50k events recording any track that enters detectors volume 1 was registered;

Row	pdg	E	vtxx	vtxy	vtxz	px	py	pz
0	-11	1.1105072	0.6417944	-1.773730	-3752.636	0.4198077	0.0007512	1.0286506

Bremsstrahlung photons 22.5 m from the collimator (beam dump)





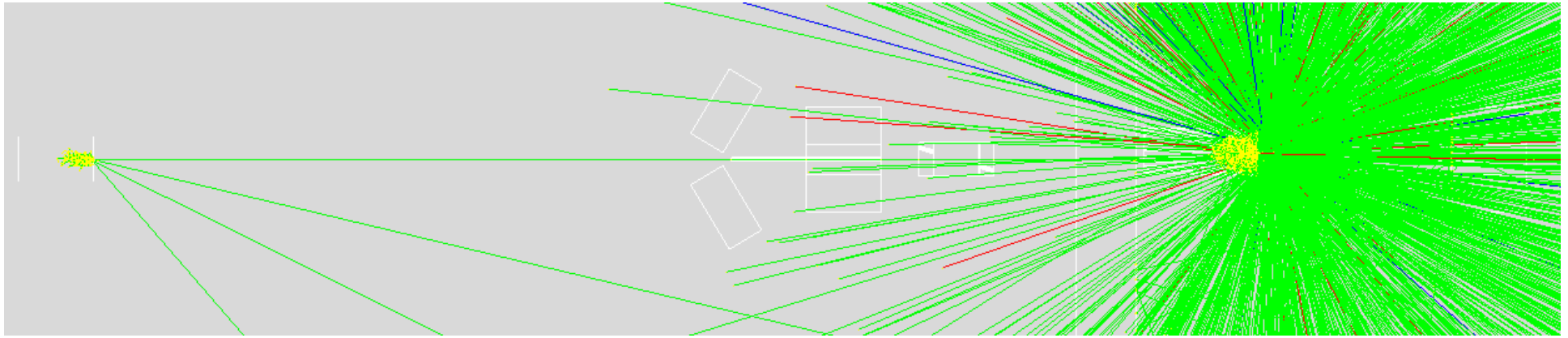


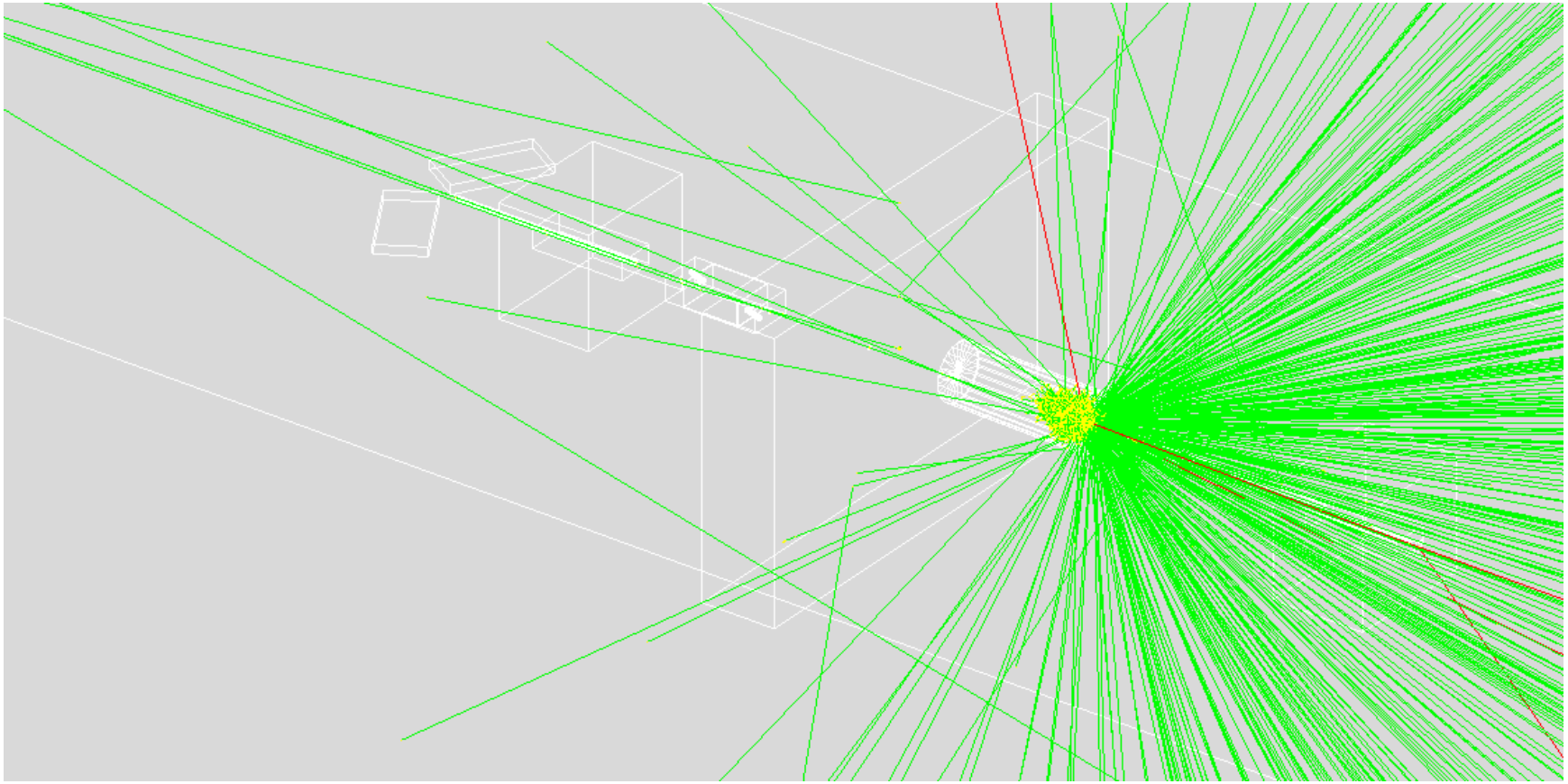
Summary and Plans

- Proceed with Geant4 simulation for background estimation.
- Compare results for different geometries.
- Comparison results with Fluka simulation made by Gianluca.
- Tune geometrical parameters of the setup in accordance with real technical requirements.

Backup

Tungsten Target, 1.4 T, ~30 e-





Sketches of Bremsstrahlung Area