LUXE Geant4 geometry vs 3D CAD

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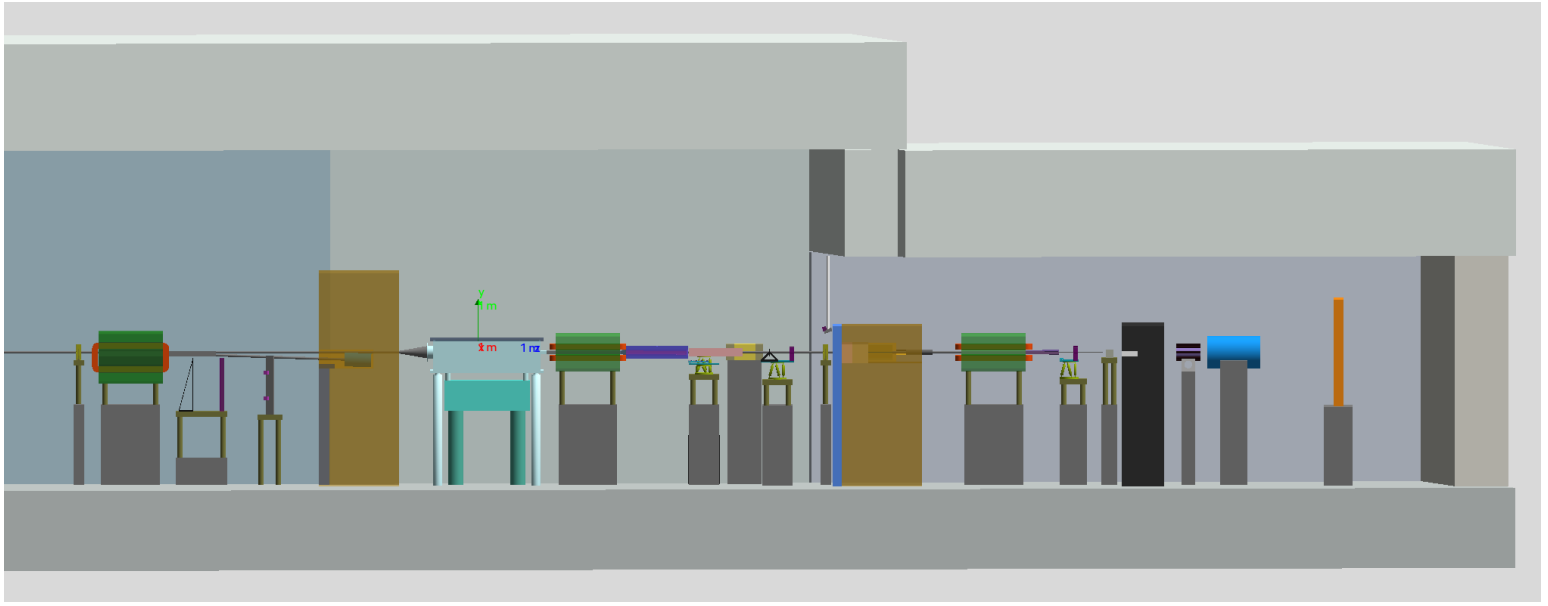
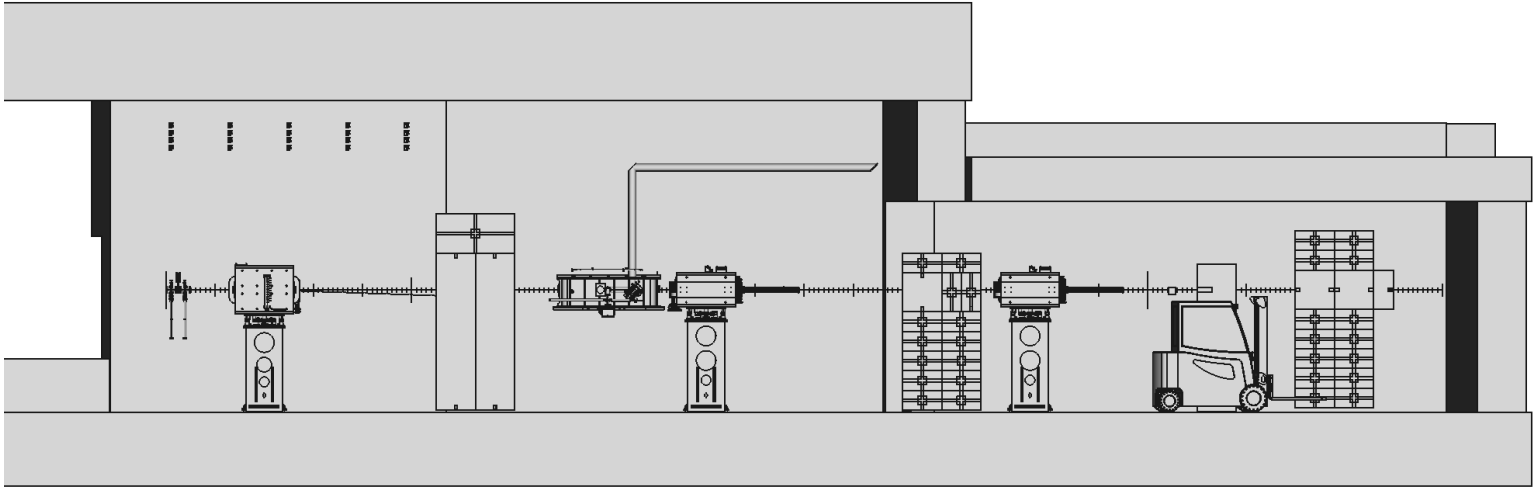
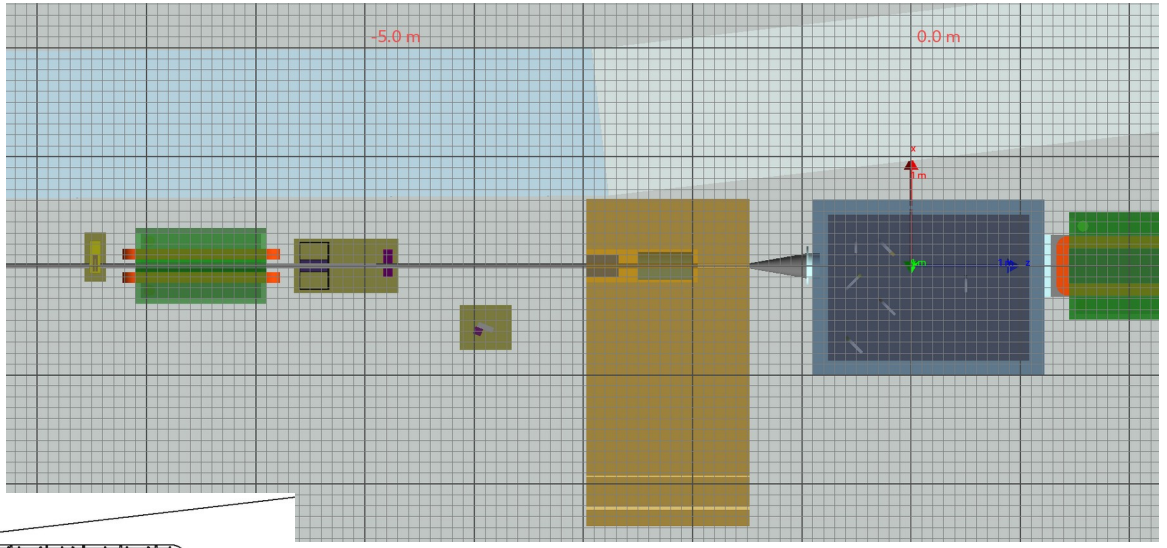
Geant4 geometry

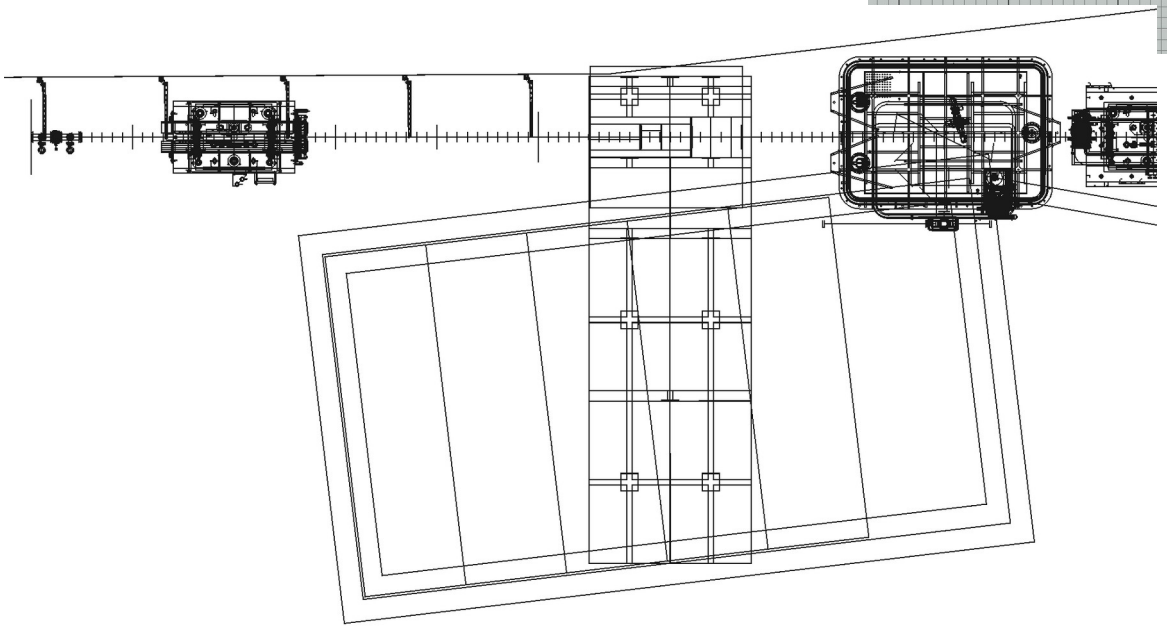




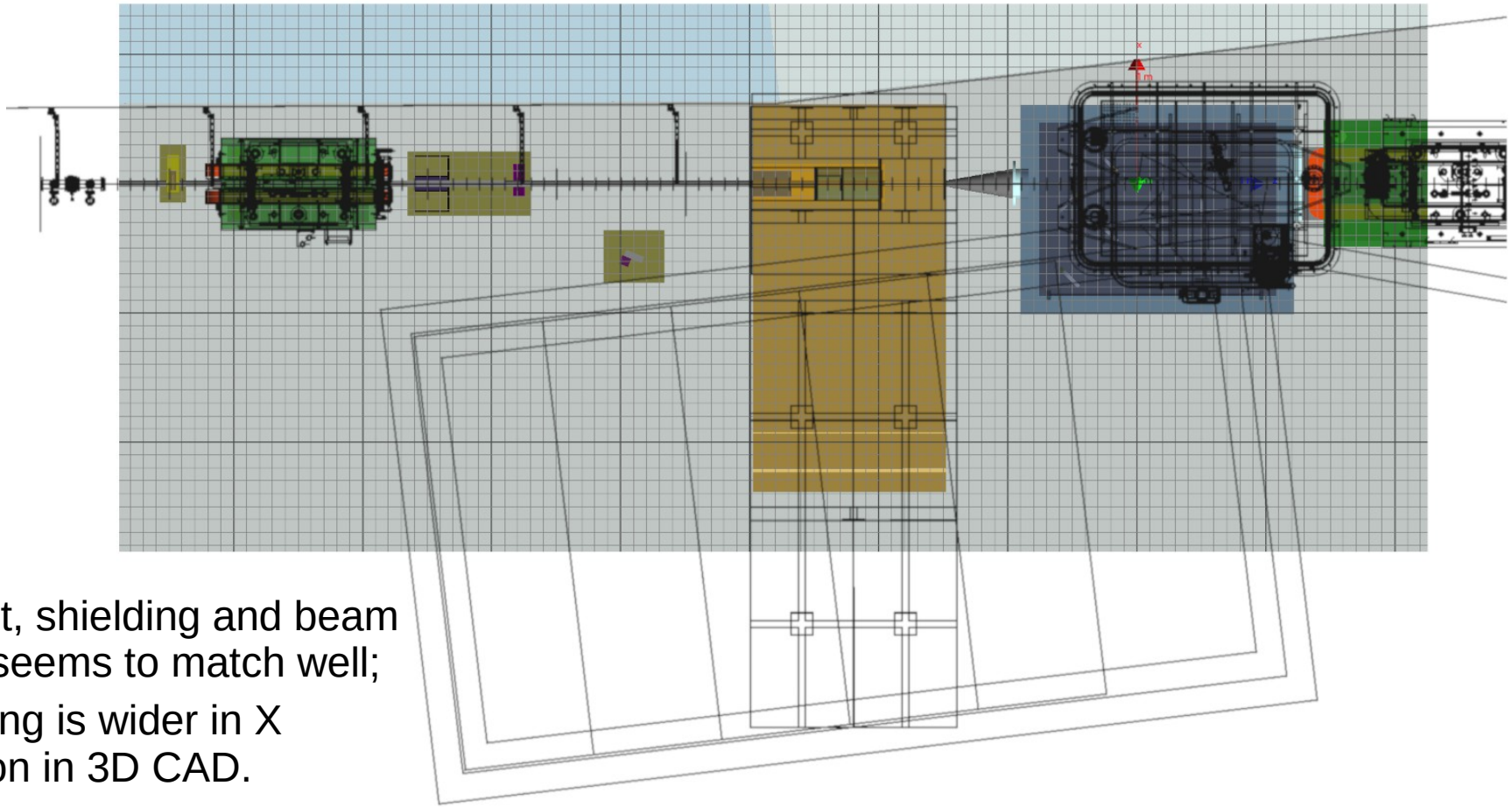
Simplified version
of 3D CAD

Top view of G4 and 3D CAD geometry upstream IP



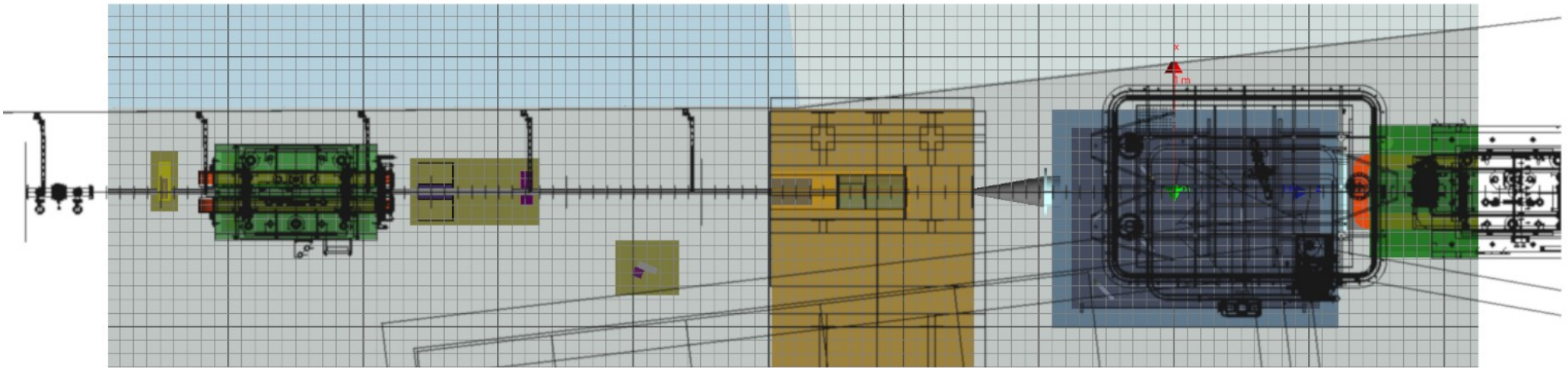


Matching position of the walls and magnet



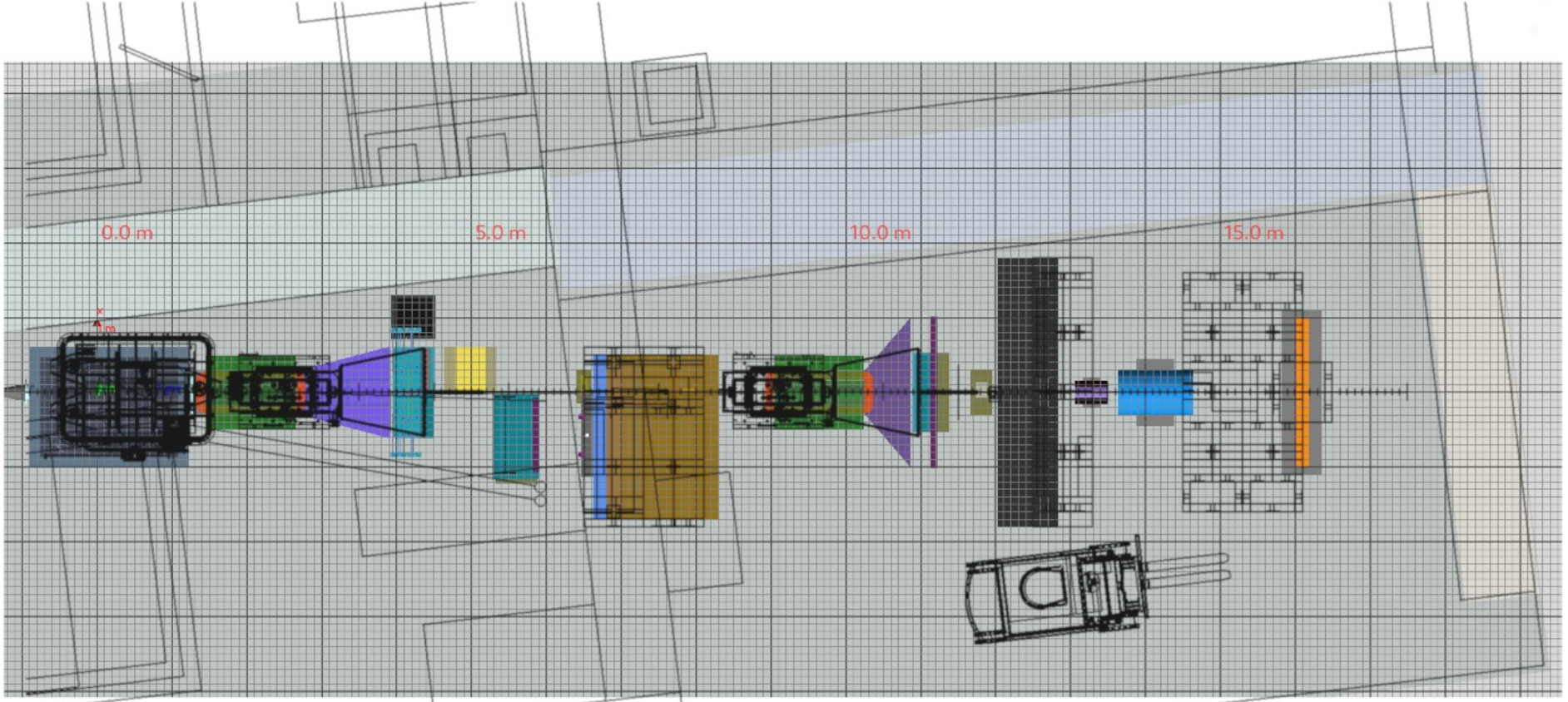
- Magnet, shielding and beam dump seems to match well;
- Shielding is wider in X direction in 3D CAD.

Matching position of the walls and magnet

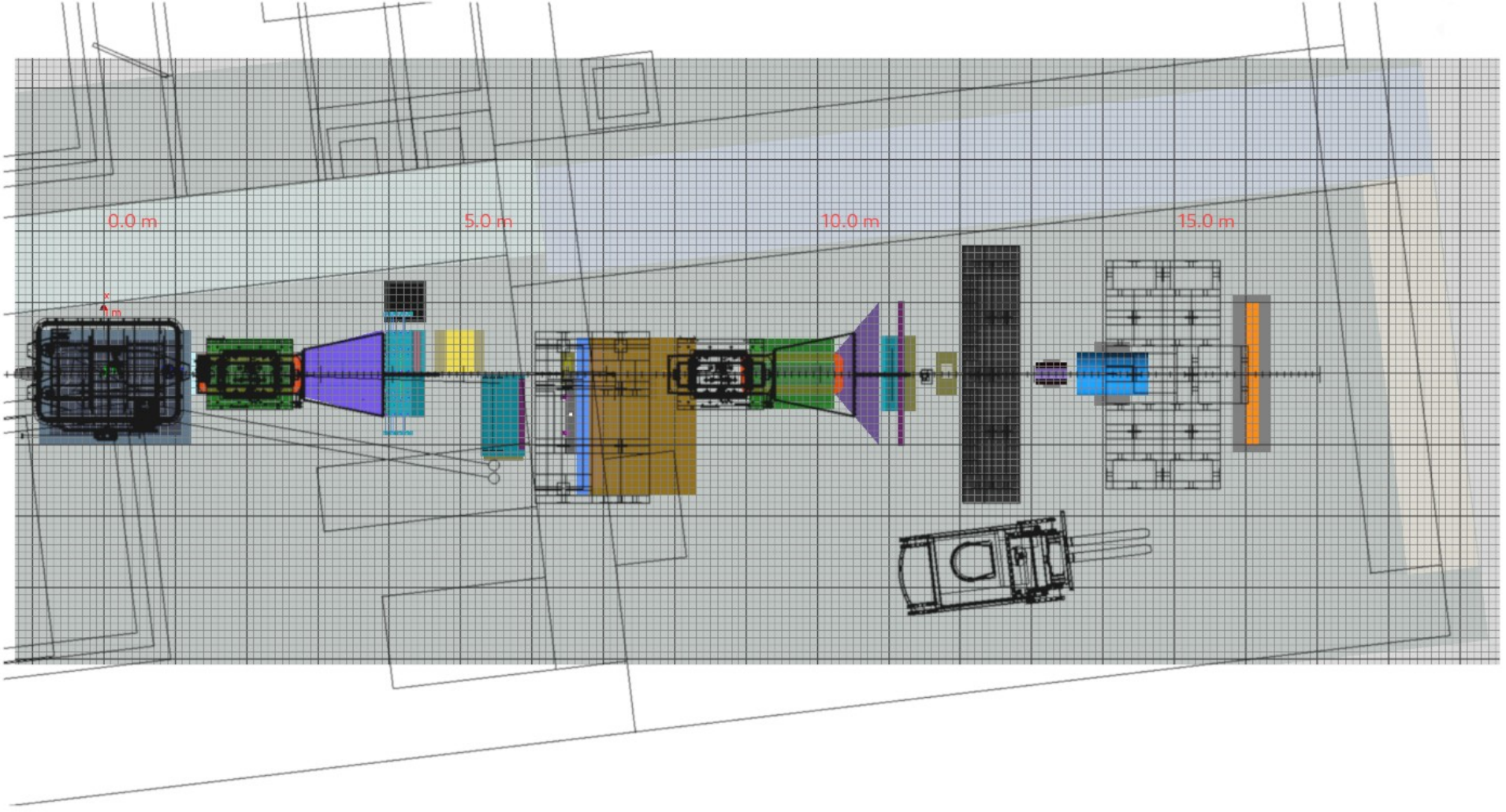


- IP is in the center of chamber in 3D CAD;
- Is it latest design?

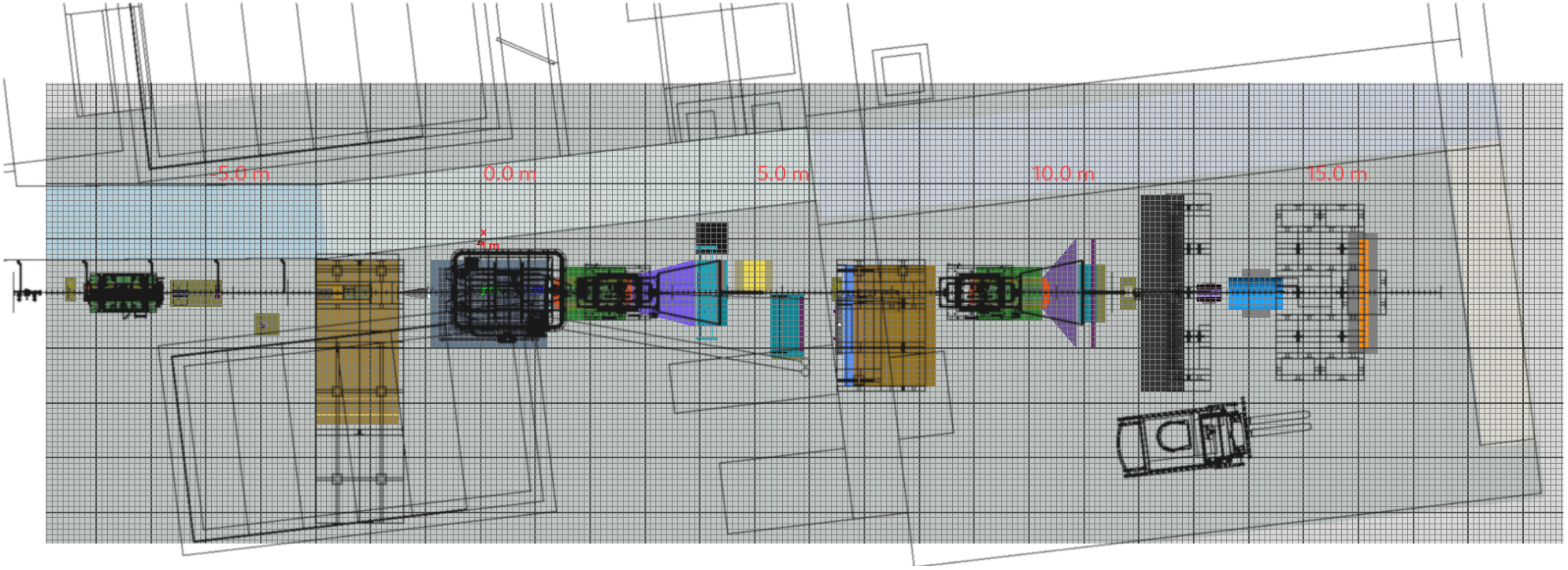
Matching position of the walls



Matching position of the magnet and shielding



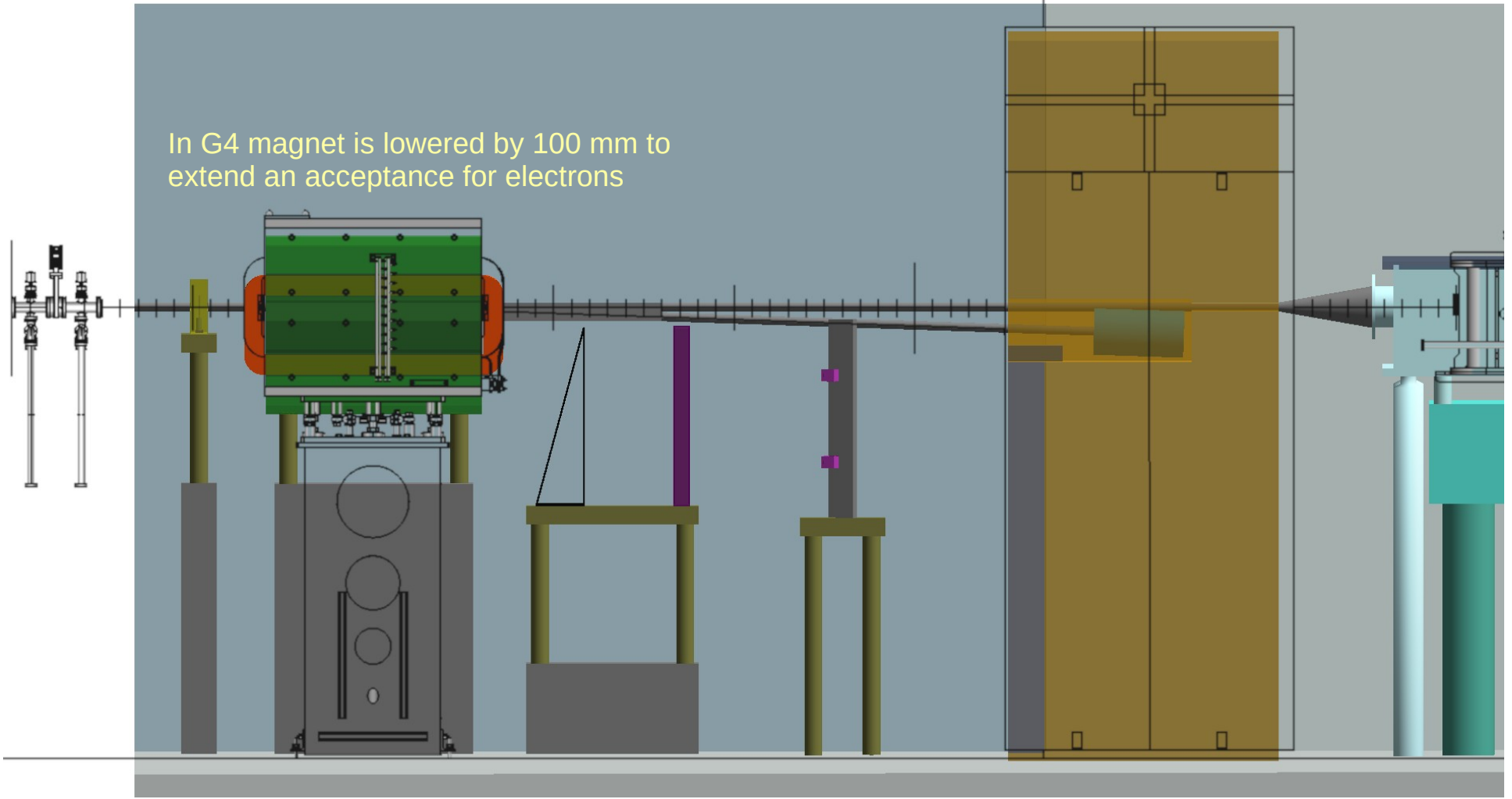
LUXE geometry, top view



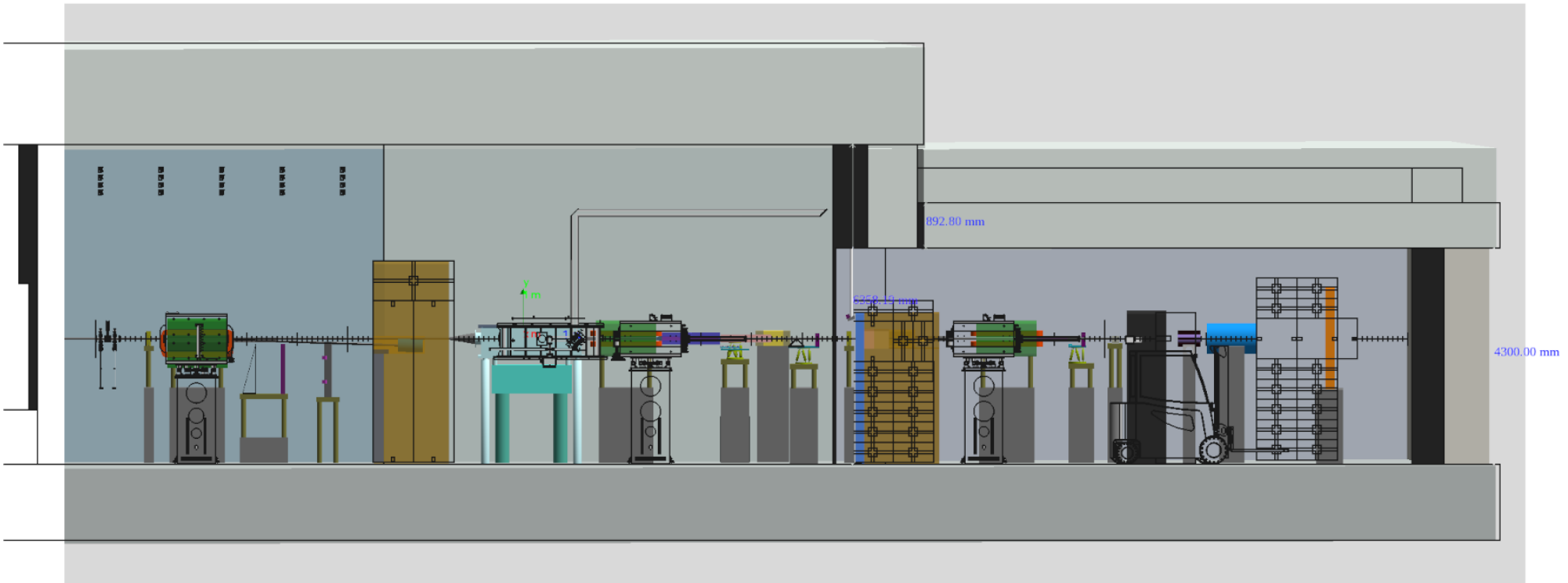
Substantial mismatches:

- IP chamber;
- Gamma spectrometer looks longer in 3D CAD (spectra is different, it is not a copy of IP spectrometer)

Side view of G4 and 3D CAD geometry upstream IP



LUXE geometry, side view



- Floor, ceiling and walls are in agreement
- Floor is 19 mm lower in 3D CAD;
- CeilingB is thinner in G4.

Summary

- The geometry of the infrastructure is in agreement within few centimeters between G4 and 3D CAD.
- IP chamber is different and produce a shift by ~0.5 m towards positive Z.
- Different geometry of the gamma spectrometer, 3D CAD version is longer. It seems to be implemented as a copy of IP spectrometer.
- The distance between the IP magnet and electron dump in e-laser mode is about 0.5 m shorter in 3D CAD.
- First magnet is placed symmetrically in vertical plane in 3D CAD while it is lowered by 10 cm in G4 geometry.