

Engineering team and configuration discussion

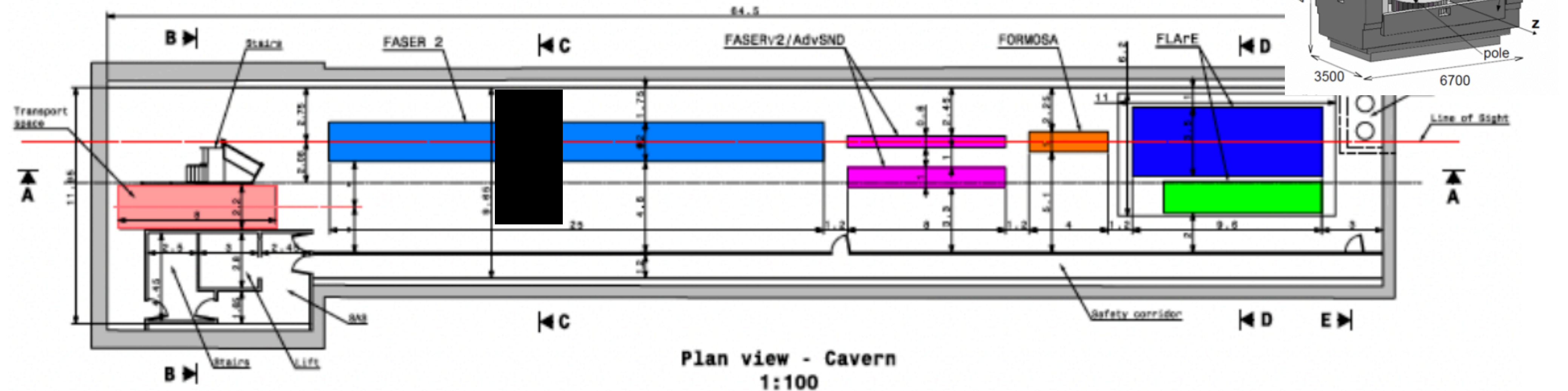
August 16, 2023 Milind Diwan

Technical team for FLARE and coordination

Very preliminary.

- Connor Miraval - BNL Project Engineer
- Larry Bartoszek - Bartoszek engineering inc.
- Jan Boissevain - Bartoszek engineering inc.
- Franck Cadoux - U. Geneva (contact for muon tagger Baby-mind)
- Jean-Piere Corso - CERN
- Scientific contacts
 - Jamie Boyd (CERN), Gianluigi Arduini (CERN) (physics beyond colliders group), Yichen Li (BNL), Steven Linden (BNL), A. Bolotnikov (BNL), M. Diwan (BNL), Sergio Rescia (BNL), Bo Yu(BNL), Jianming Bian (UCI)
 - Alan Barr (Oxford), Hidetoshi Otono (Kyushu), Yasuhiro Makida (KEK), Naoyuki Sumi (KEK), — (coordination w.r.t FASER2 magnet)
 - Physics Simulations: Matteo Vicenzi (BNL postdoc), Wenjie Wu (UCI postdoc) , Student from Oxford U.?

Configuration choices

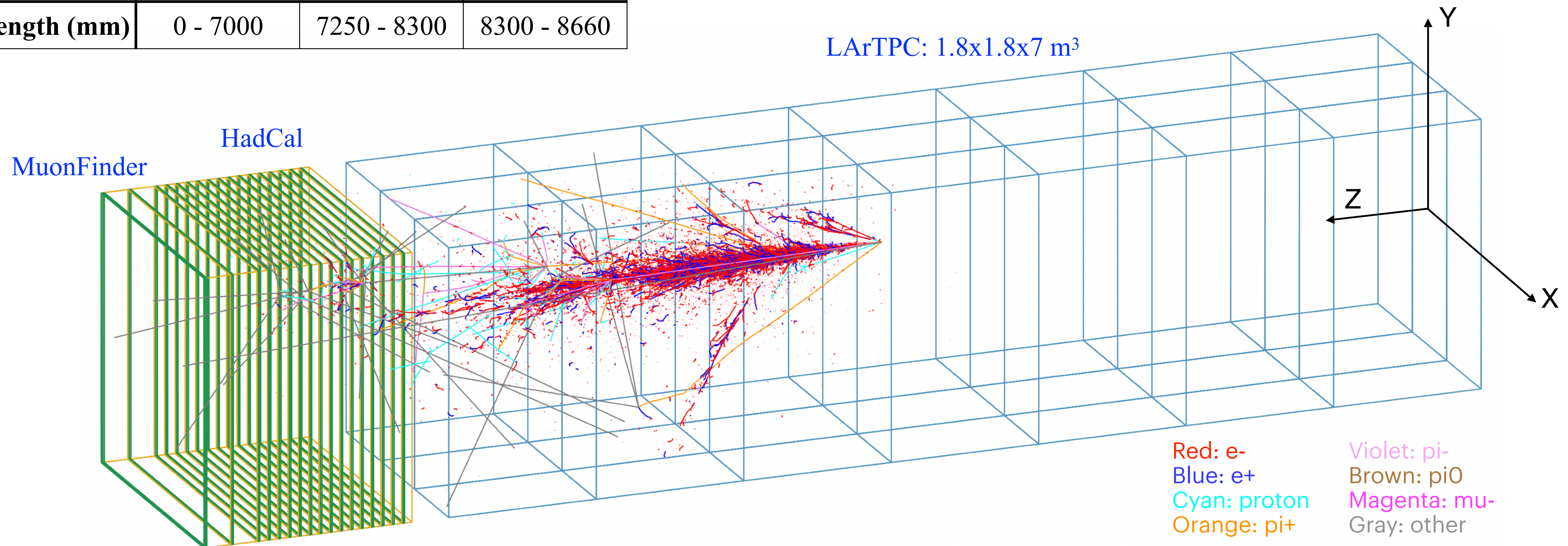


- Reference choice: Need to add a hadronic calorimeter and muon tagger to FLARE. Place a large (Samurai) dipole in FASER2.
- Option 1: Place FORMOSA at the end of FASER2. Use the space for a magnetized muon tagger for FLARE.
- Option 2: Move FLARE behind FASER2nu and eliminate FLARE magnetized muon tagger. Use FLARE as a tracker/tagger FASER2nu.
- Option 3: Use existing crystal pulling magnets as spectrometer magnets for FASER2.

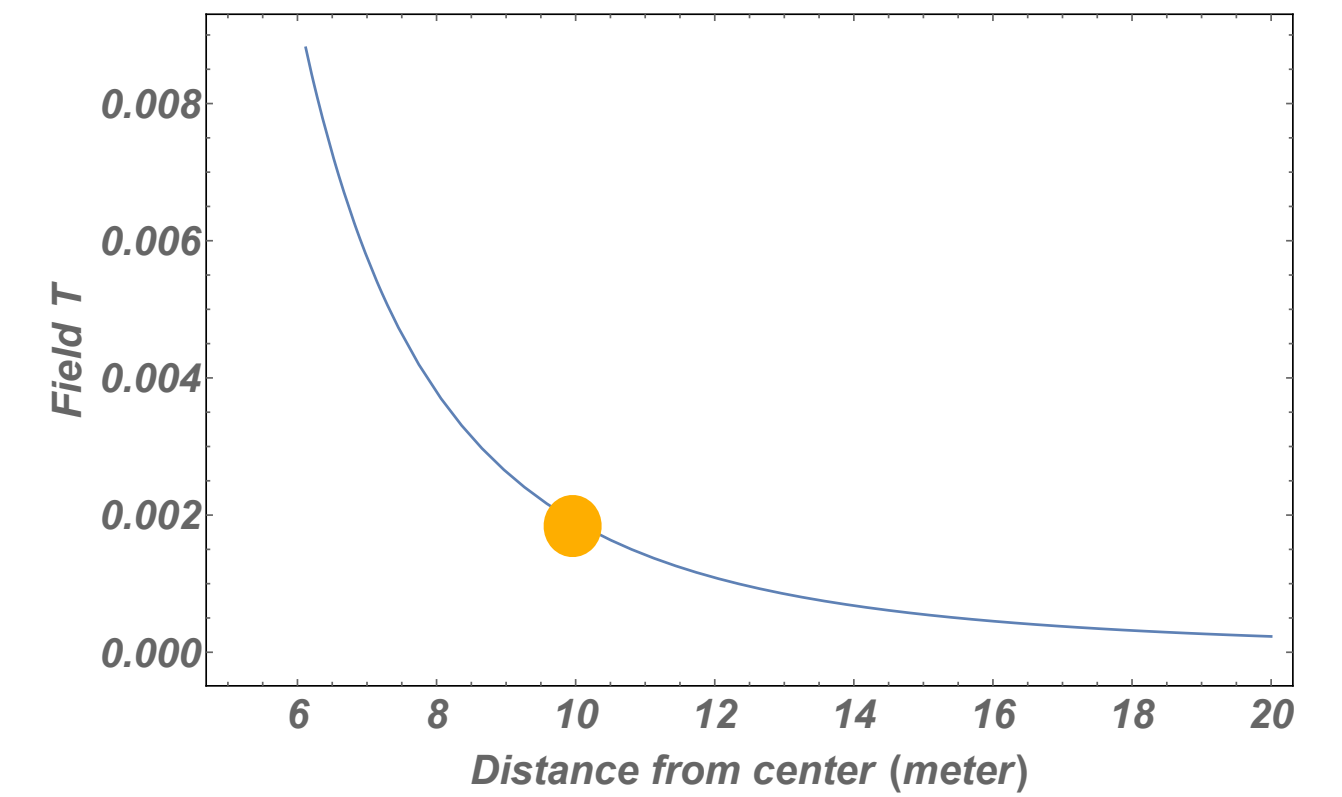
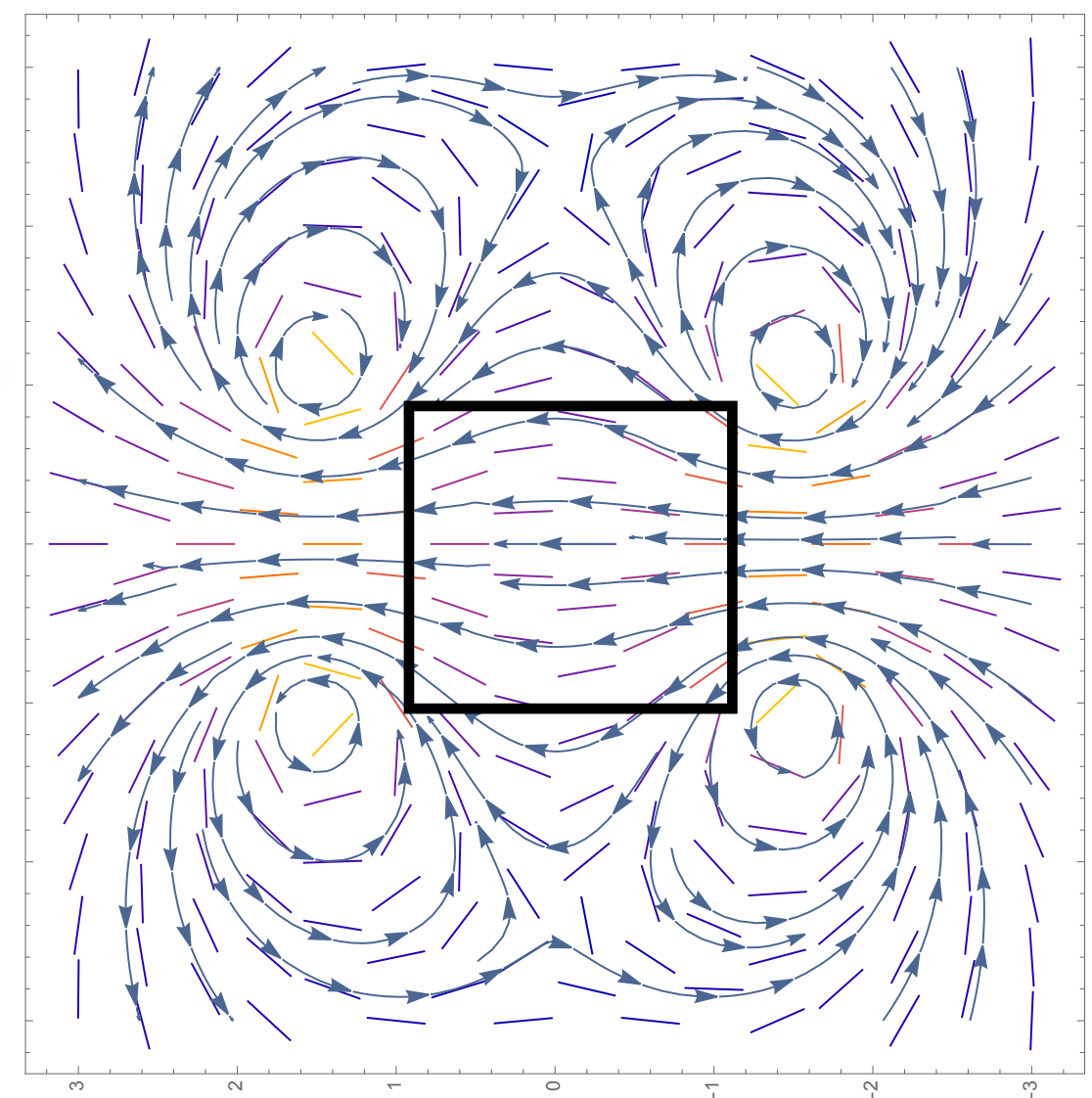
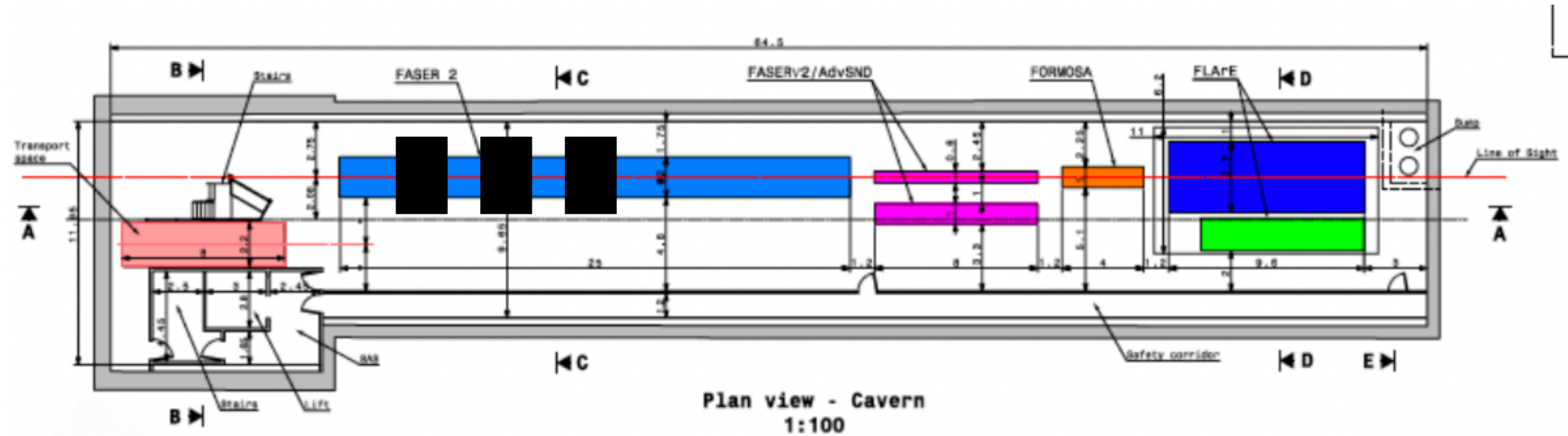
Detector configuration in simulation

- **Fiducial mass** of 10 tons ($1 \times 1 \times 7 \text{ m}^3$) is needed for good statistics and sensitivity to dark matter.
- Detector needs to have good **energy containment and resolution** for neutrino physics.
- **Muon and electron ID**. Very good **spatial resolution** ($\sim 1 \text{ mm}$) for tau neutrino detection.

	LArTPC	HadCal	MuonFinder
Length (mm)	0 - 7000	7250 - 8300	8300 - 8660



Just use crystal puller magnets rotated by 90 deg.



2X2 m fiducial. Center field ~ 0.6 T

The bend plane may have to be vertical to support the coils.

Field can be improved with addition of steel
Without shielding field at the LHC will be ~ 20 gauss.