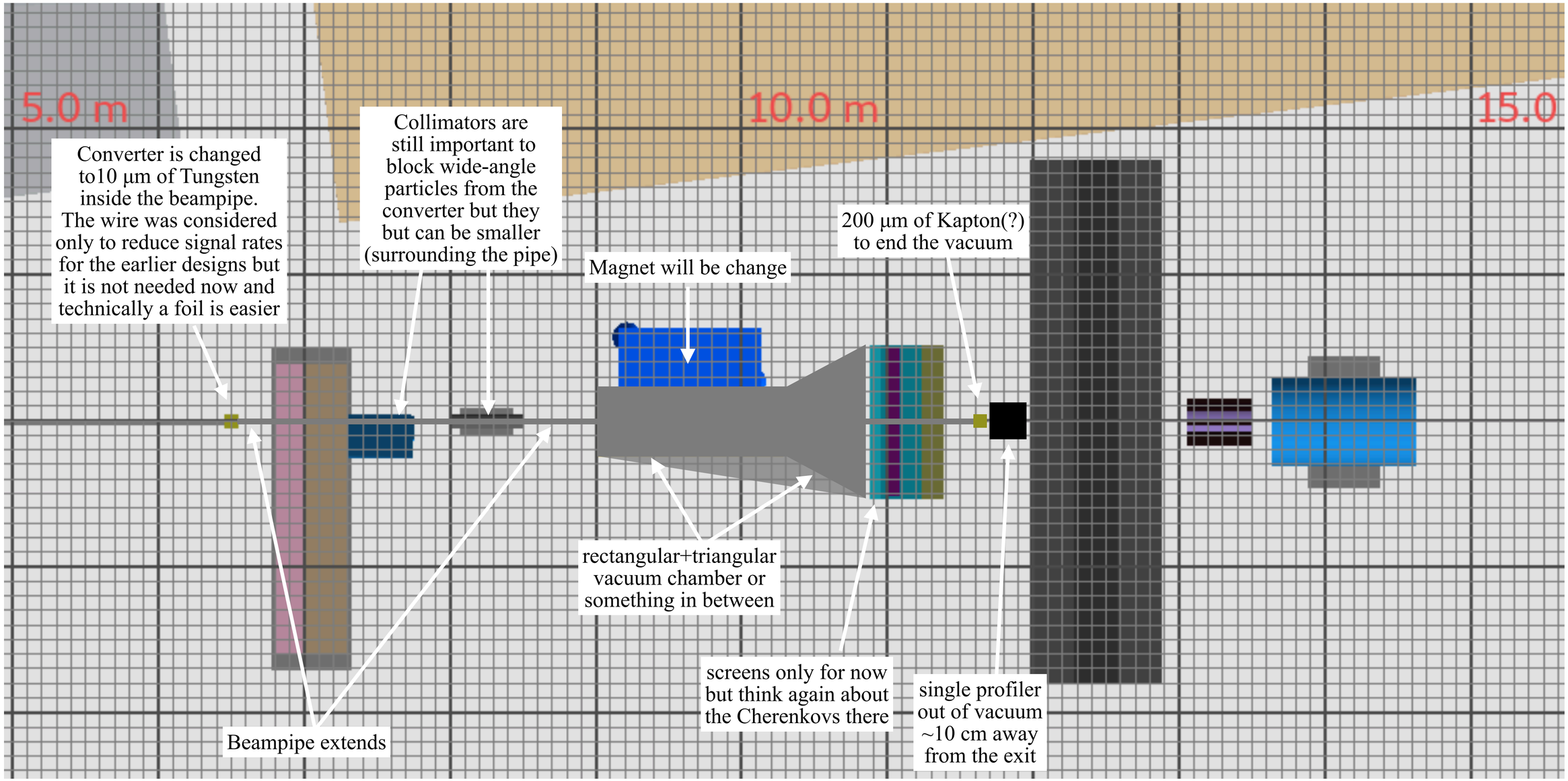
Simulation and Analysis

Mar 16 2021

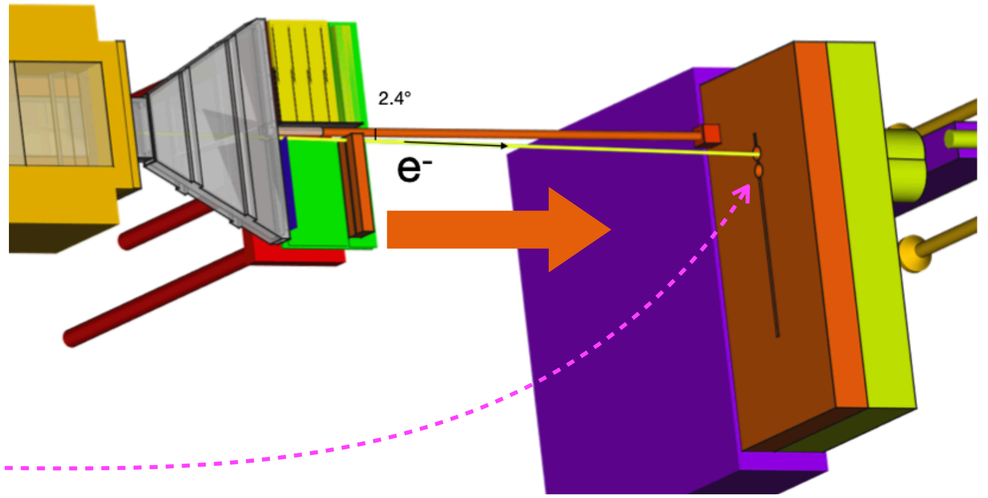
Recap #1: extension of the FWD beampipe



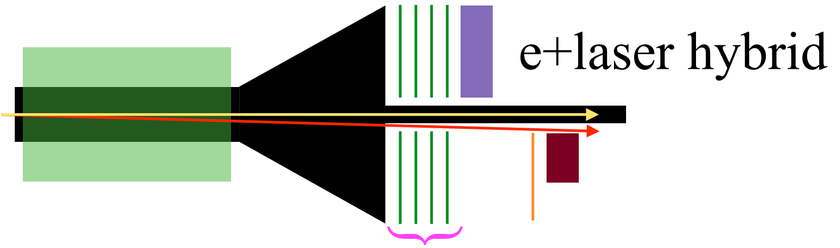
Recap #1: no vacuum at the IP detectors

- XFEL: no problem to have the beam flying in air for a few m's
  - no need to work in vacuum from safety point of view
  - already demonstrated that can reconstruct the physics w/o vacuum

- Won't be able to reach a 2 T B-field
  - push the screen+Cherenkov downstream by ~1.5 m
    - edge reconstruction is possible even with 1.5 T
    - need one dump for the electron beam after the detectors
    - will have to switch to a long (0.5 m?) long dump in x for the Comptons

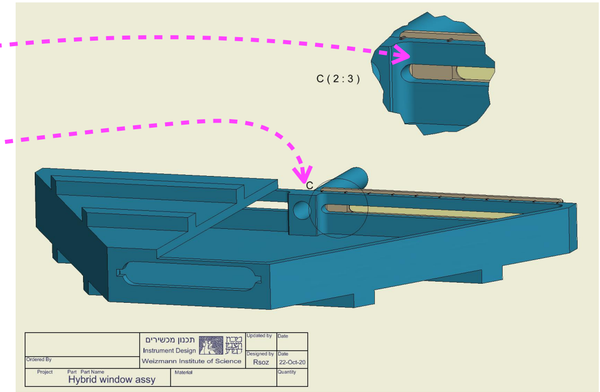


- Electron tracker can be in the same z position as the screen+Cherenkov but
  - away from the beam path when running in e+laser mode
  - inline with the positron tracker when running in γ+laser mode
  - use hexapod or equivalent



Electron tracker is below the e-beam path

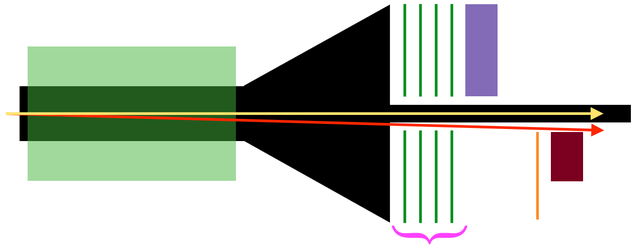
- Triangular chamber exit window: testing the impact (sig/bkg) of "full-length" 0.5mm Aluminium instead of 0.5mm Aluminium + 200um Kapton mixture
  - need some optimisation of the joint to the pipe going to the FWD part



- Still need to discuss the upstream movable conversion target

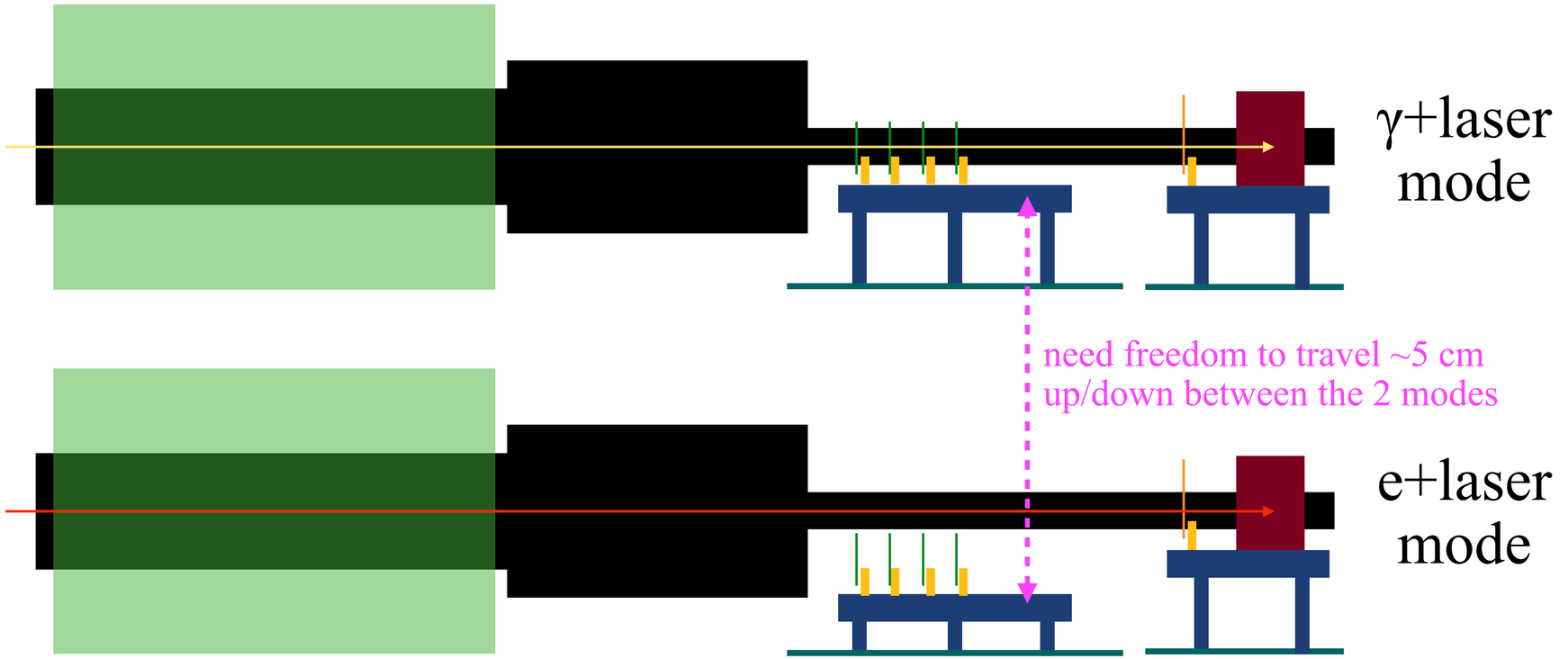
Hybrid setup views

Top view



Electron tracker is below the e-beam path in e+laser mode

Side view



Recap #2

- **Tuesday, Mar 9: towards a decision on the vacuum chamber of the IP detectors: yes/no/partially/how?**
  Note that this is linked to the question of how we implement the hybrid setup, but we want to first focus on the question whether or not it is possible for each system to work in vacuum and how services are routed out.
  People from all relevant subsystems: please think if it is possible or completely not and come up with a recommendation for this meeting (ideally 1-2 slides per system).

- **Tuesday, Mar 16: first general engineering review of all elements along the experiment**
  Benny & Oz have confirmed this is possible. It'd be great if we have someone from other institutions (Jena?).
  This will be an iterative process that won't end just with these 2 meetings (+we will get more feedback from the PRC).
  Sasha and Louis - it'd require some preparation of coherent material for this meeting, mostly detailed cad models. If we can send something to the engineers before that it'd be even better.

- **Tuesday Mar 23: second general engineering review of all elements along the experiment**
  TBC - will fill up the details later

- **Tuesday, Mar 30: collective definition of the EDM and GEANT4 output format**
  will fill up the details later (note: Passover in IL is from Mar 27 to Apr 3)

- **Tuesday, Apr 6: ICS technical discussion regarding the physics simulation and the technical implementation.**
  will fill up the details later (note: Easter holidays in EU are Good Friday (Apr 2) to Easter Monday (Apr 5))

“Mandate” for Eng. mini-review(s)

- Goal is to have a basic review of the design of the components in the hall from an engineering perspective for the purpose of refining the simulation model for the timescale of April-May.

- For all active and passive components that are of relevance for the simulation, it should be reviewed how these are supported, whether these should/can be movable, whether these should/can be in a vacuum, how these can be aligned and where services are routed, etc

- In addition, the location of racks, cooling elements, vacuum pumps (etc) and their connections as relevant to the simulation will also be reviewed

- Finally, we will review also how to control the environment around the elements (if not completely in vacuum) as needed and again, as relevant to the simulation

- We do not review elements which do not have an active or semi-active impact on the simulation. For example, we don’t go in detail:
  - inside the IP chamber
  - how the laser is channeled in its pipe, but maybe we need to look at bkg generated on/in it, etc