Update

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WP6 Meeting

31st October 2023
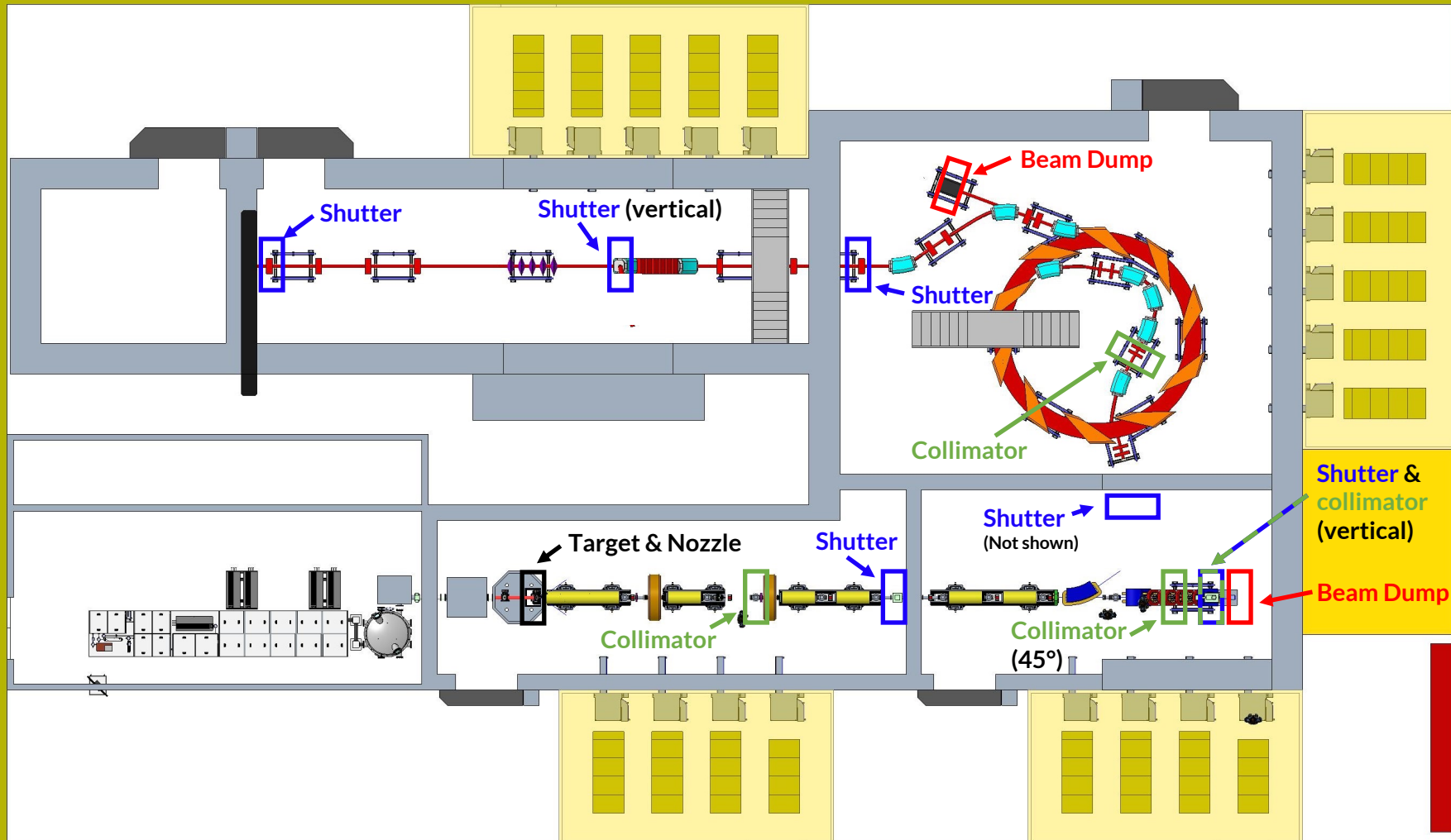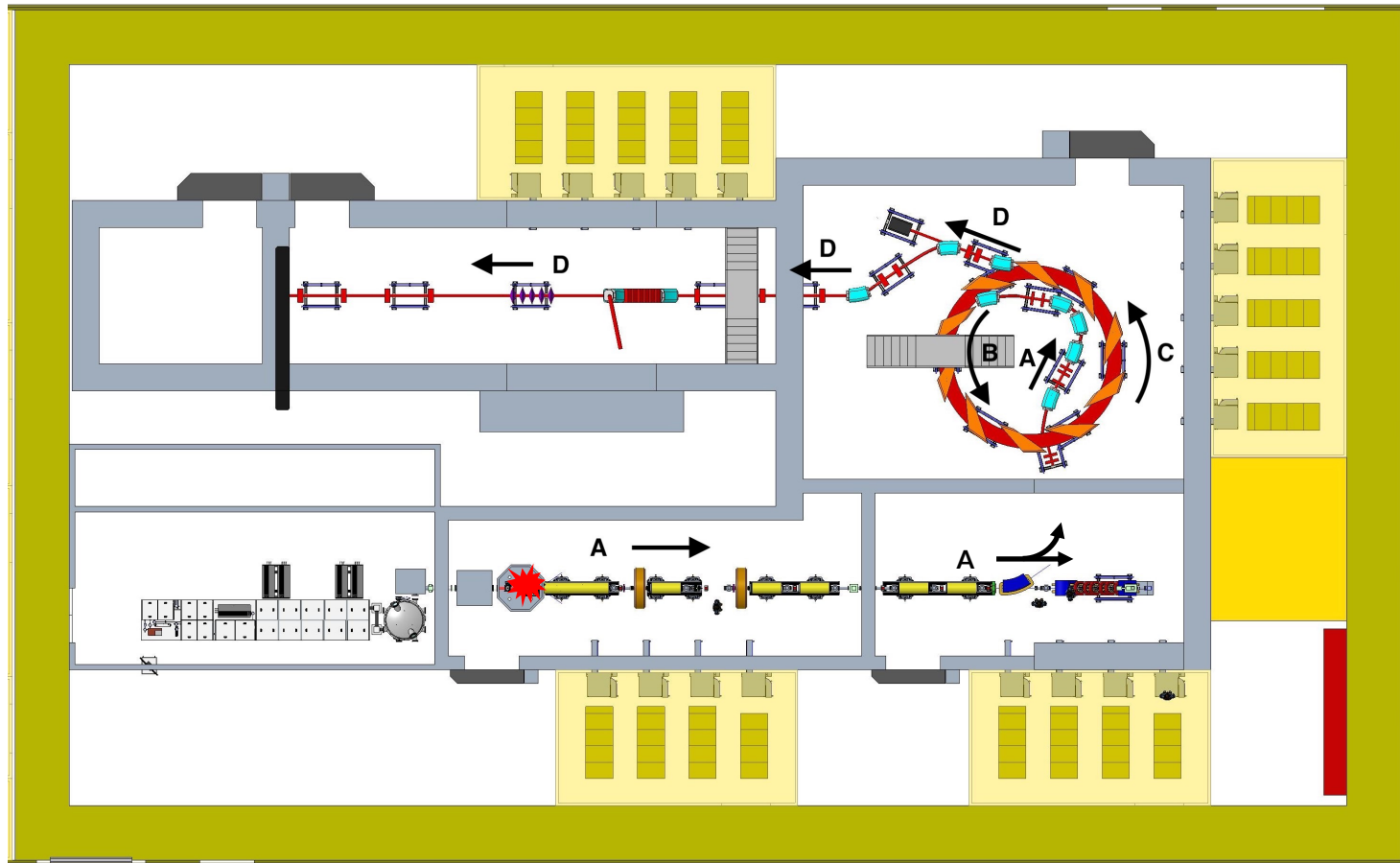
- FFA injection line modelling
  - Model behaviour irregularities – stage 1 optimised for space-charge mitigation
  - BDSIM – minor tweaking
  - GPT – problematic, dipoles & beam
    - Beam recorded in time – partially in fields
    - Bunch length at injection line start (1σ radius):
      - 11.1 cm, ~2.1 ns at 15 MeV

- FFA line remodel – status?
  - FFA position w.r.t accelerator origin point
  - Same injection conditions
  - Agreed wall thickness – 1m
  - Dispersive section for energy selection / cleaning
  - Same cumulative dipole angles?

- Beam parameters at start of FFA injection line:

```
S: 17.964599173887013
Alpha_x: −0.05529897572
Alpha_y: −0.06378866227
Beta_x: 49.7763443
Beta_y: 52.47593878
Emitt_x: 2.9457443241284283e−06
Emitt_y: 2.828938566090647e−06
Sigma_x: 0.01201410077
Sigma_y: 0.01208854728
Sigma_z: 0.1109727026
Sigma_xp: 0.00024170190265067082
Sigma_yp: 0.000230804596215771713
Sigma_E: 0.0002039310729
```

A: **1.6.nA**

B: **4.63 mA** *

C: **10.42 mA** *

D: **1.6 nA**

* assumed coasting beam

- 10 Hz laser rep. rate
- 10^9 protons / bunch
- FFA R_{min}/R_{max} = 2.92 / 3.48 m
- FFA E_{inj}/E_{ext} = 15.0 / 127.4 MeV

Other Updates

- PPRIG slides written & circulated

- Planning BDSIM Gabor lens element
    - Field description – copy solenoid beam line element recipe

- RF-track
    - Writing
        - Ascii particle coordinate loader
        - Pygpt coordinate exporter

Summary

- Done:
    - PPRIG talk
    - Loss point & beam current

- Ongoing:
    - RF-Track modelling
    - FFA injection line simulations with updated beam
    - Fortnightly talk – stage 1 baseline update proposal

- Todo:
    - Gabor lens in BDSIM
    - Performance evaluation of ± 5% beams
    - Update models of alternative baseline design (v5.5)
    - Develop OPAL model of FFA