Rome Workshop MDI Summary Report

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Radiation Backgrounds

Event Generation

- Pair production process simulated with the GuineaPig program and the output fed into Geant4 detector simulation

- *Long* time for colliding bunches to cross each other (e.g. Higgs operation with bunch length ~3.6 mm)

- Caveat: charged particles travelling over certain distance without seeing the solenoidal field, which unfortunately introduces bias to the hit positions

→ To implement external field in the GuineaPig, feature request sent to the author (to be followed up)

Pair Production Simulated by GuineaPig, √s=240 GeV — CEPC

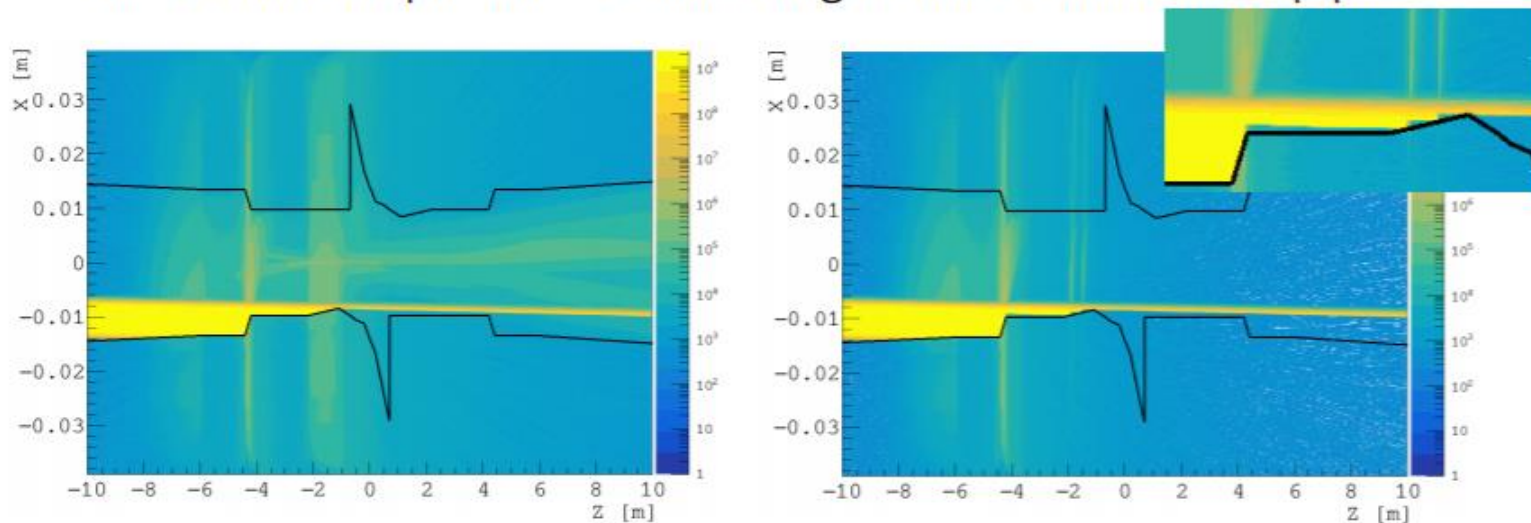Pair Production Simulated by GuineaPig, √s=250 GeV — ILC
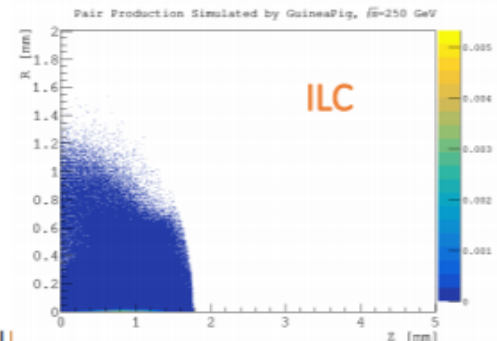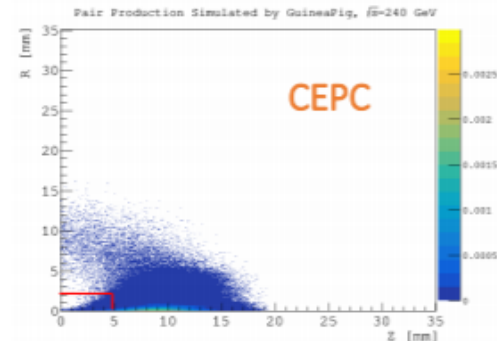
Synchrotron Radiation

With proper collimation design (mask shape + material), SR photons can be significantly suppressed – under control

With Collimation

- Three masks at 1.51, 1.93 and 4.2 m along the beam pipe to the IP to block SR photons → shielding to the central beam pipe
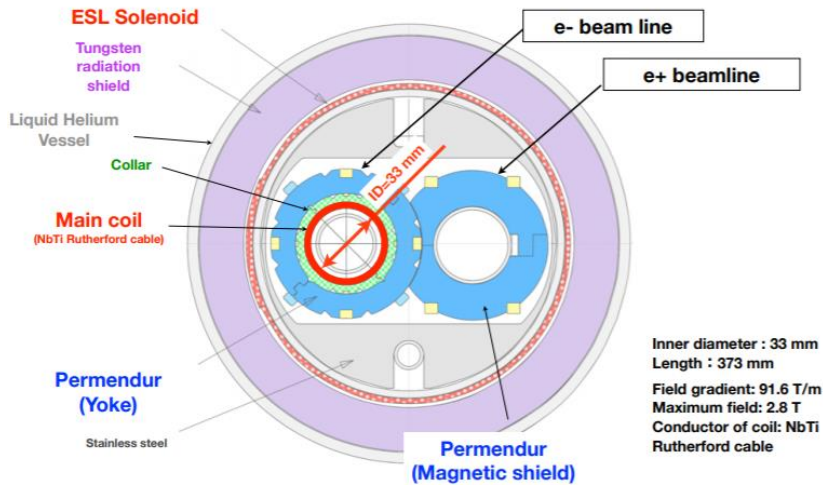

- Number of photons per bunch hitting the central beam pipe dropping from 40, 000 to 80; power deposition reduced considerably
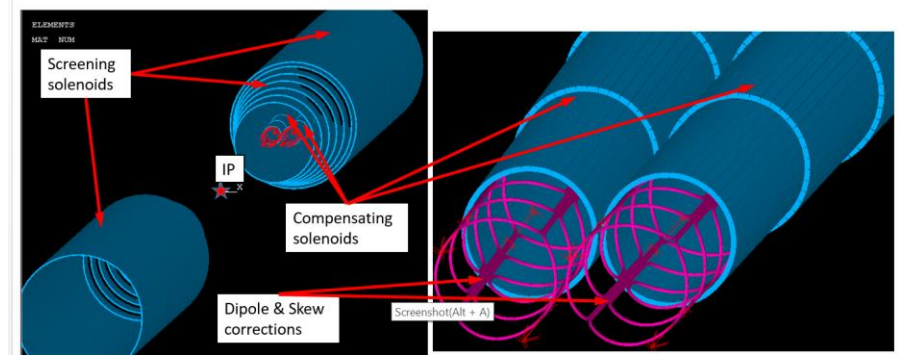
3

Magnets

FCC-ee design
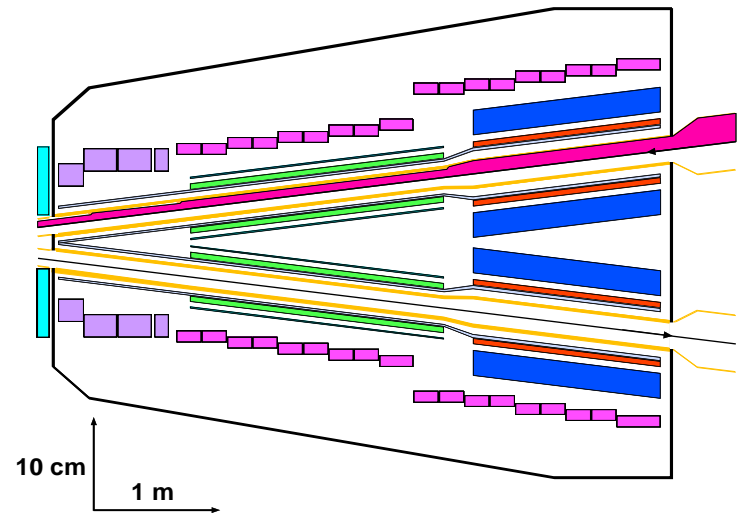
SuperKEKB magnet (one out of several types) already installed
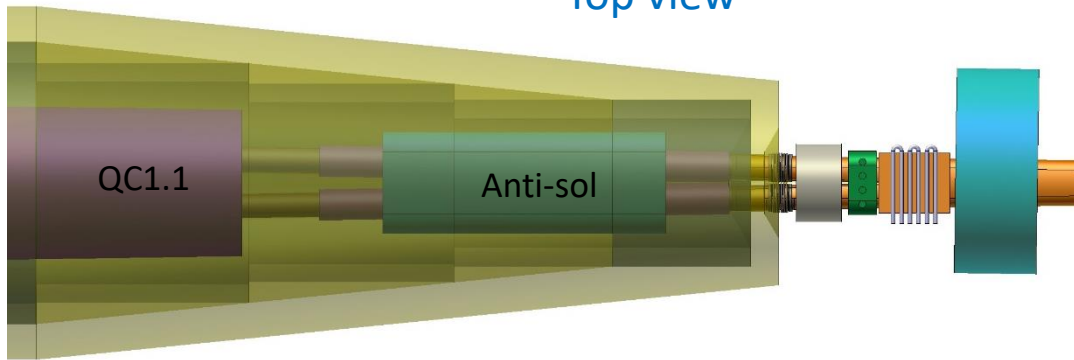

Cross section of QC1LE with Lq. Helium Vessel

CEPC layout

Mounting/Installation Scheme

FCC-ee

Top view

QC1.1
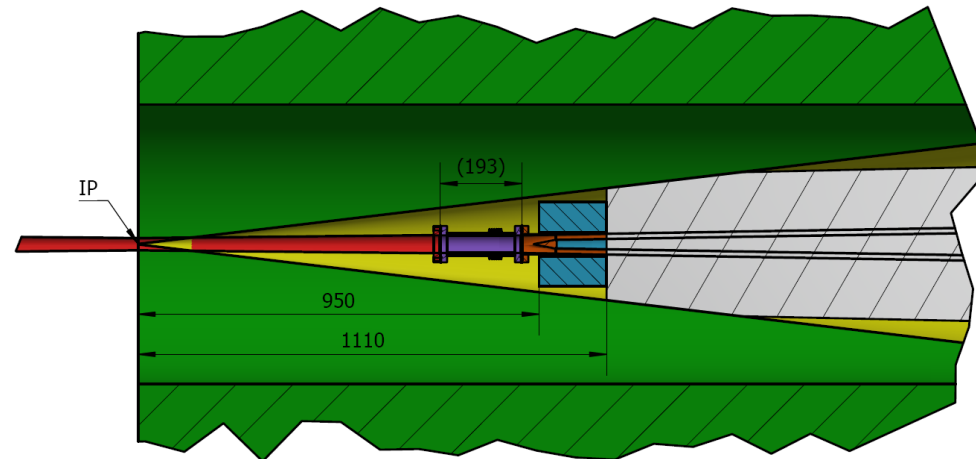
Anti-sol

Mounting the heavy LumiCal on the light tracker – not acceptable

CEPC

Mounting LumiCal on the magnet but with "materials" in front – not acceptable

IP

(193)

950

1110

Equally bad, no easy solution – *to be further explored*