SR in Direct Photon Calorimeters

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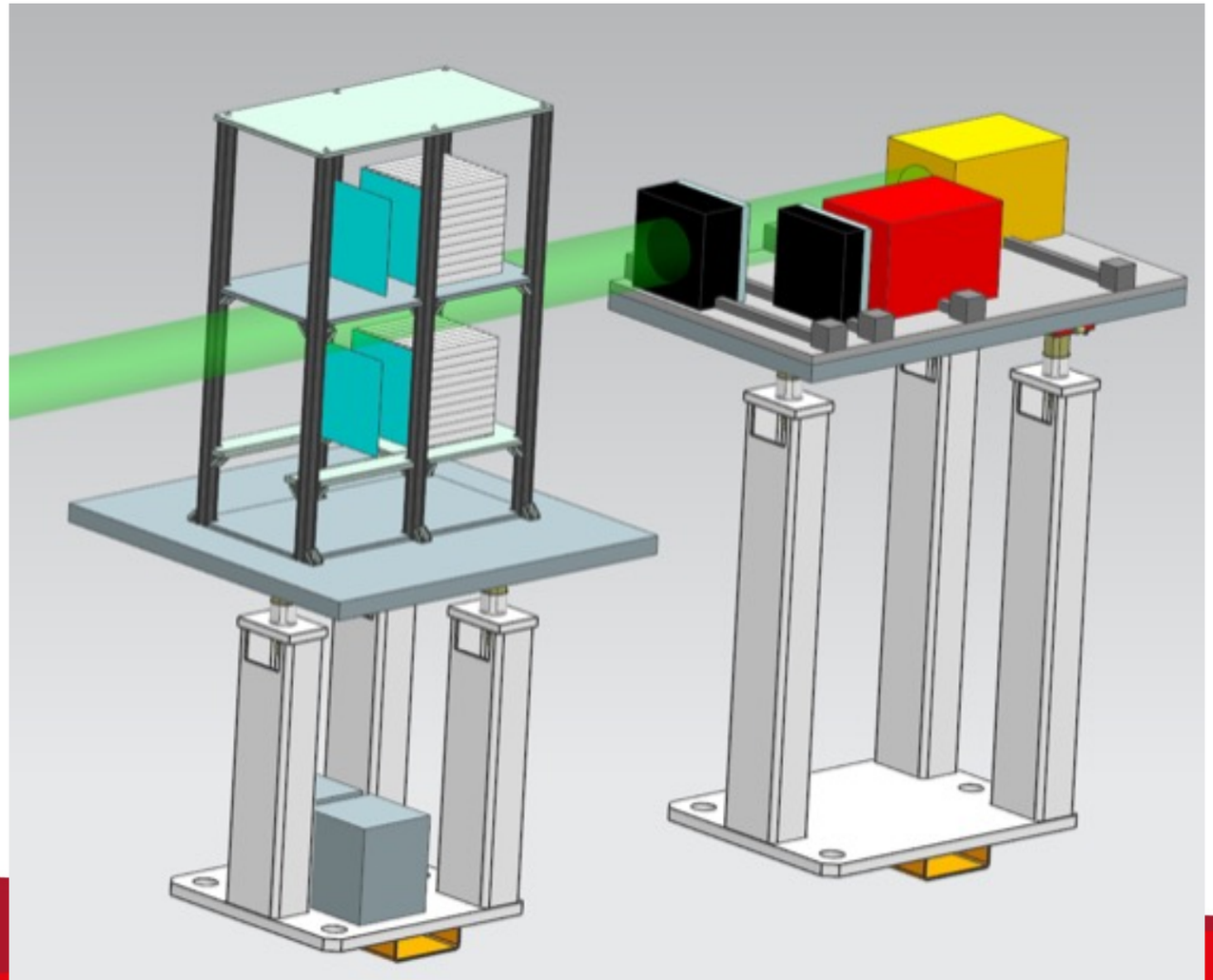
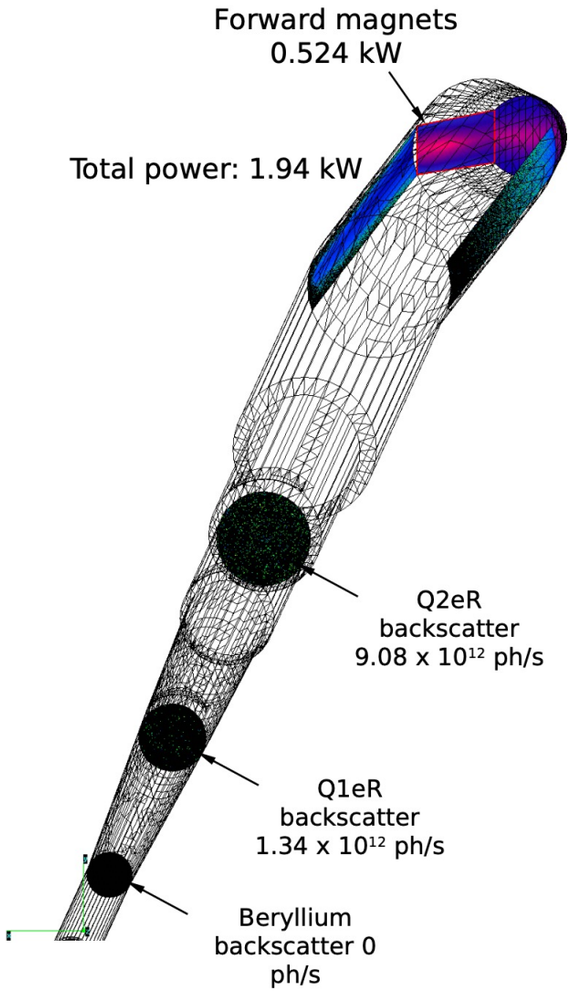
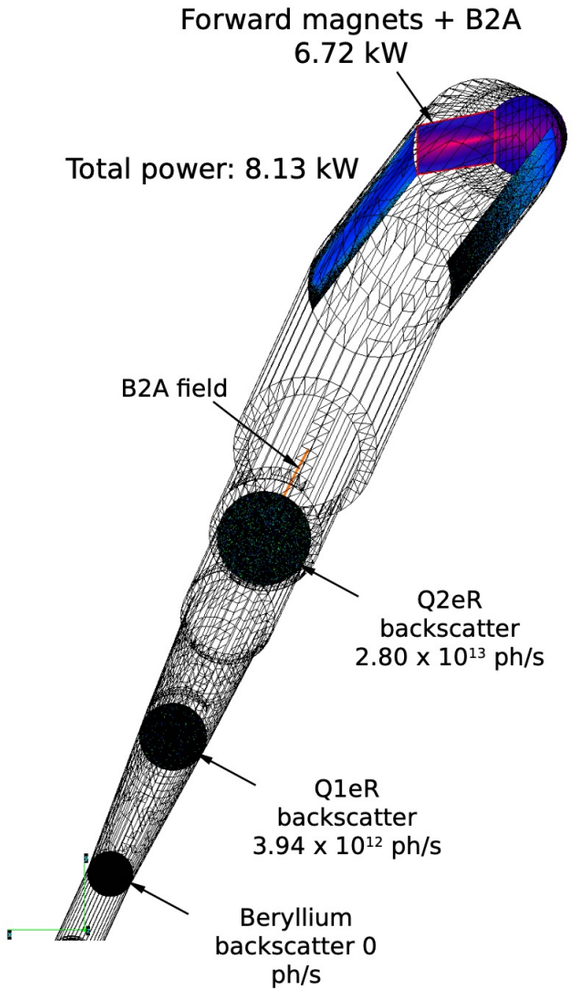


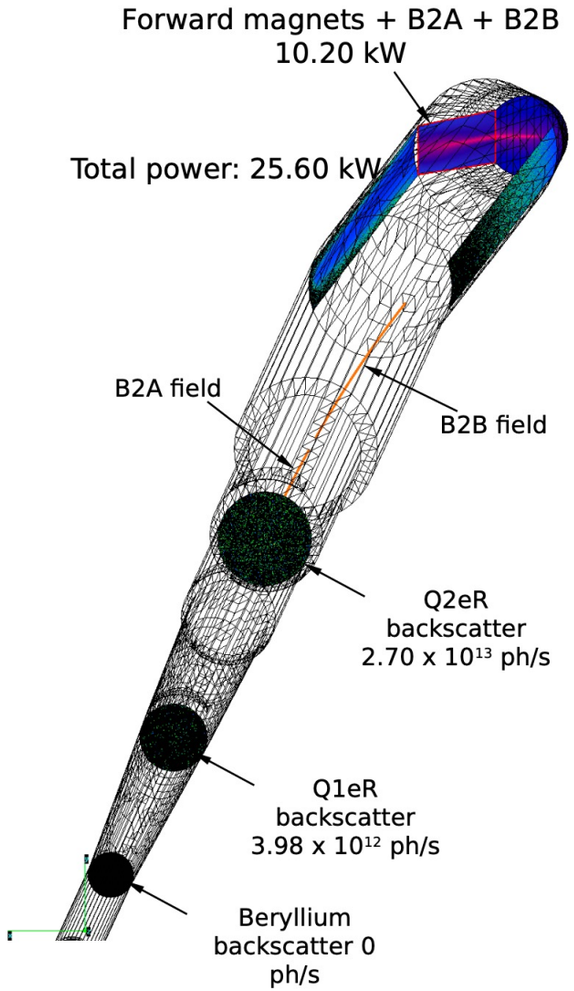
Lumi Meeting, 16/1/2024

Reminder

From Ch. Hetzel







Observation:
> 90% of SR relevant for HRC is due to **B2AeR**

https://indico.bnl.gov/event/20499/

Attack plan

0. The problem: how to cope in MC with **10^{-10} attenuation** of SR ⇒ simplify model

1. Assume that only B2AeR is a SR source ⇒ one parameter per beam: SR critical energy = 0.9, 7.5 and 40 keV for 5, 10 and 18 GeV electrons, respectively.

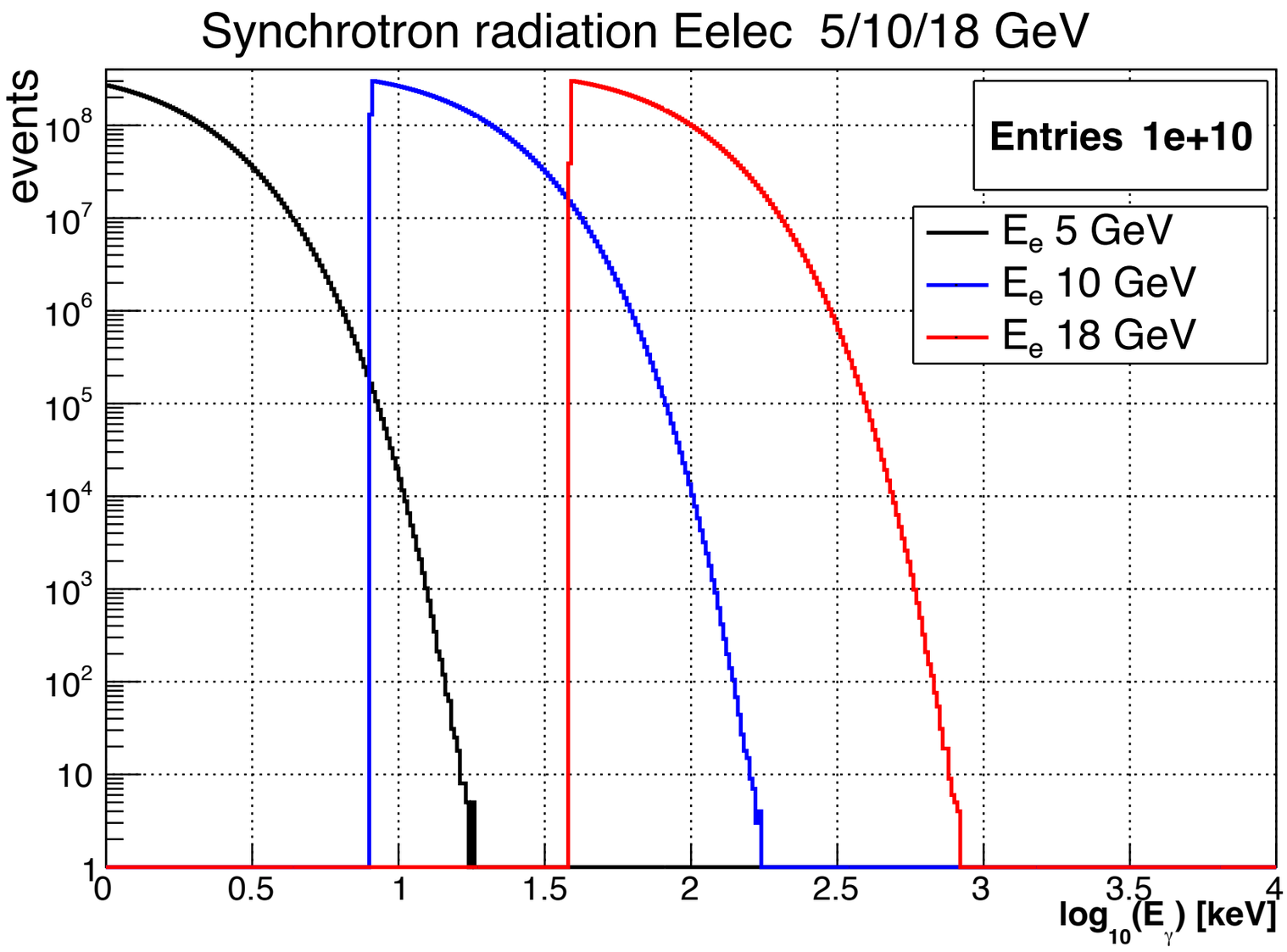
2. Check with G4 (full) SR event generator which photon energies can be neglected
⇒ run super fast generator for photon energies above relevant critical energies

3. Use maximal filling factor for (quartz) fiber calorimeter = 64%, and **2 mm W wall** before fiber start

4. Add **graphite absorbers** when necessary ⇒ for 10 and 18 GeV beams

4. Run > 100M hard SR photon events in G4…

Super fast SR event generation



Preliminary conclusions

1. No extra SR attenuation needed at 5 GeV, even crystal calorimeters can be used as the exit window stops it all

2. Only 5 cm graphite block (< 0.3 X_0) is needed to stop all SR at 10 GeV

3. 35 cm graphite (< 2 X_0) is needed to stop SR at 18 GeV – it is good news as such filter was used for direct photons at HERA I, when 1% lumi precision was achieved

4. More details will come…