Cerenkov Prototype for LUXE in March TB

A proposal.

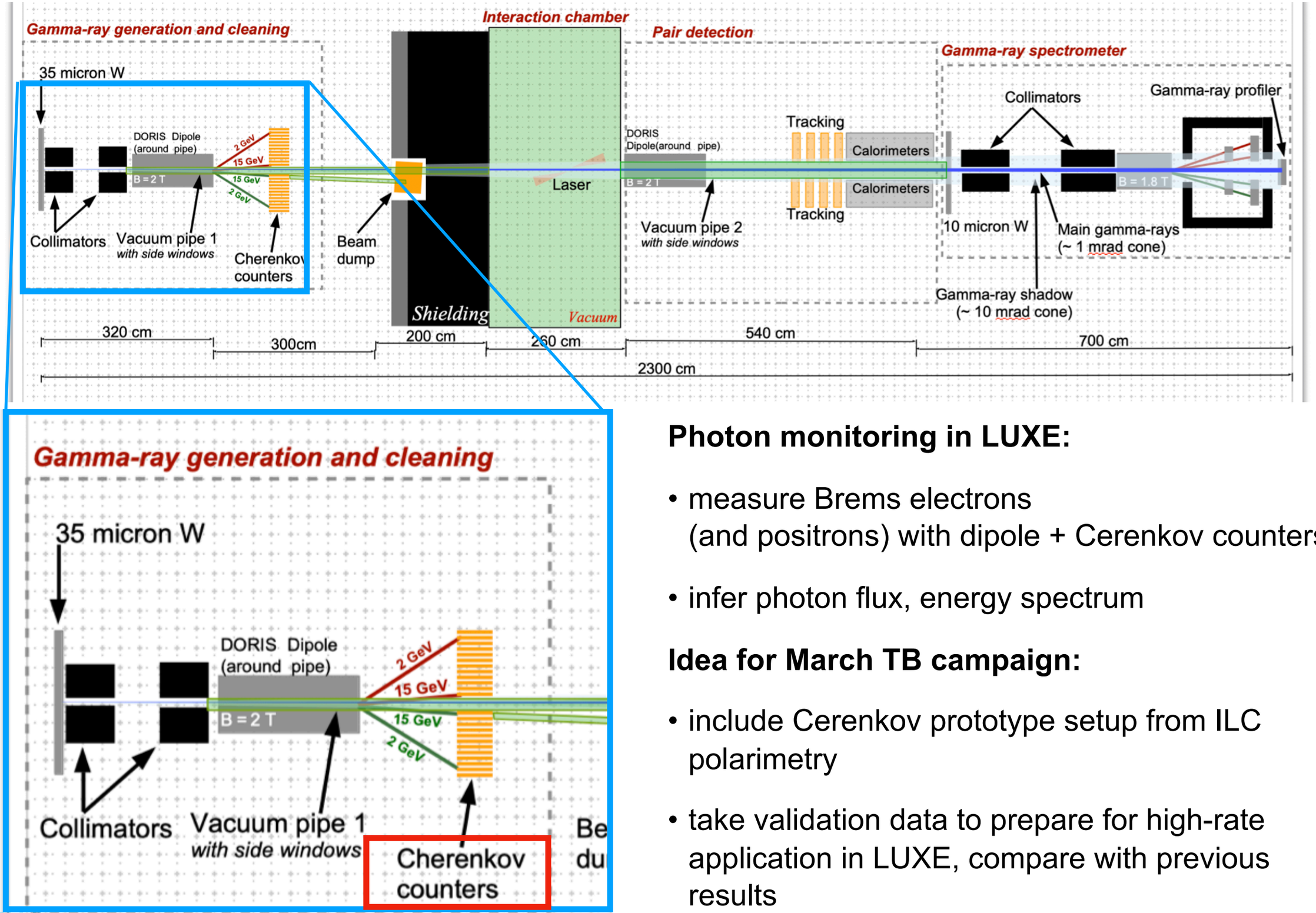
Ruth Jacobs on behalf of DESY LUXE team
FCAL Hardware weekly meeting, 11.12.2019

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

DESY.

Idea

LUXE γ+γ_{Laser} - setup



Photon monitoring in LUXE:

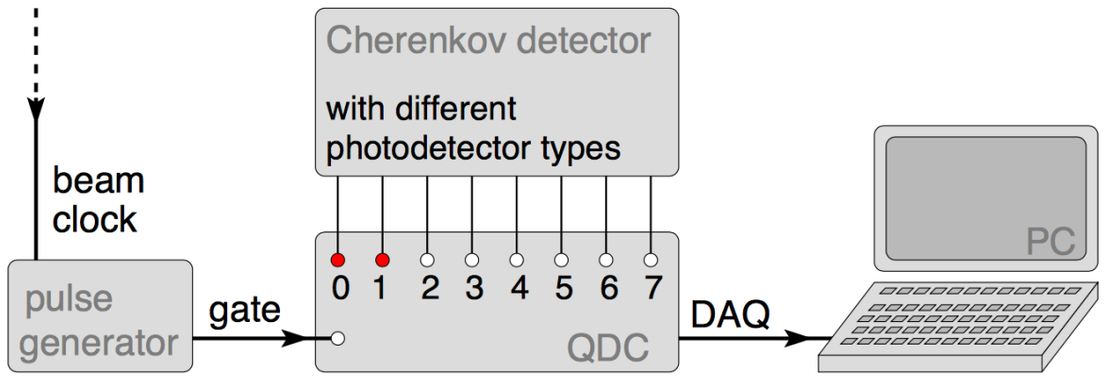
- measure Brems electrons (and positrons) with dipole + Cerenkov counters
- infer photon flux, energy spectrum

Idea for March TB campaign:

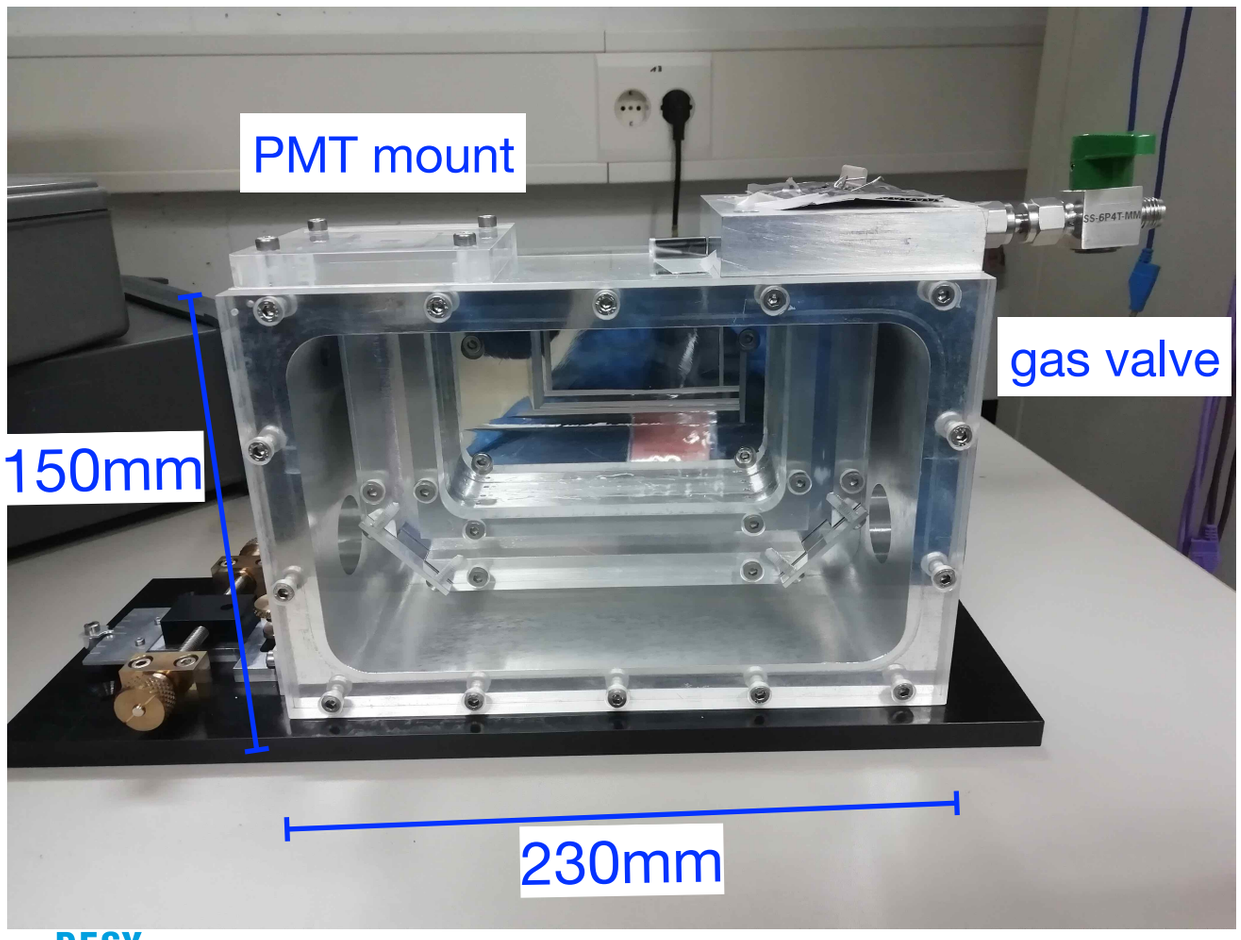
- include Cerenkov prototype setup from ILC polarimetry
- take validation data to prepare for high-rate application in LUXE, compare with previous results

C. Bartels
DESY-THESIS-2011-034

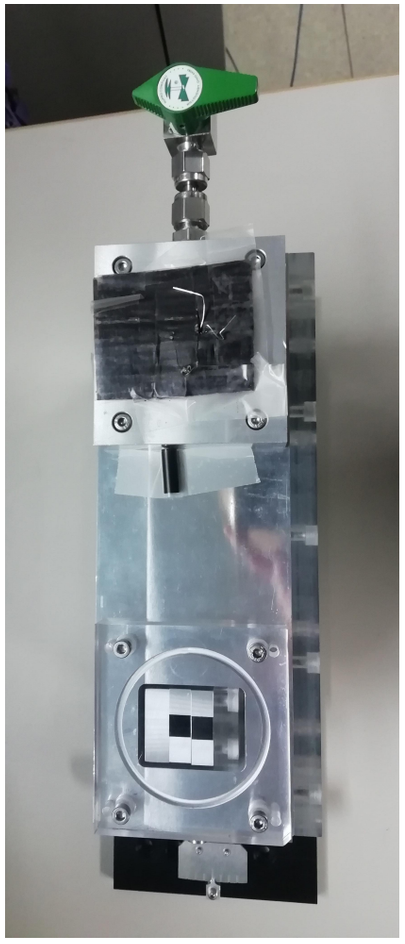
Cerenkov Prototype



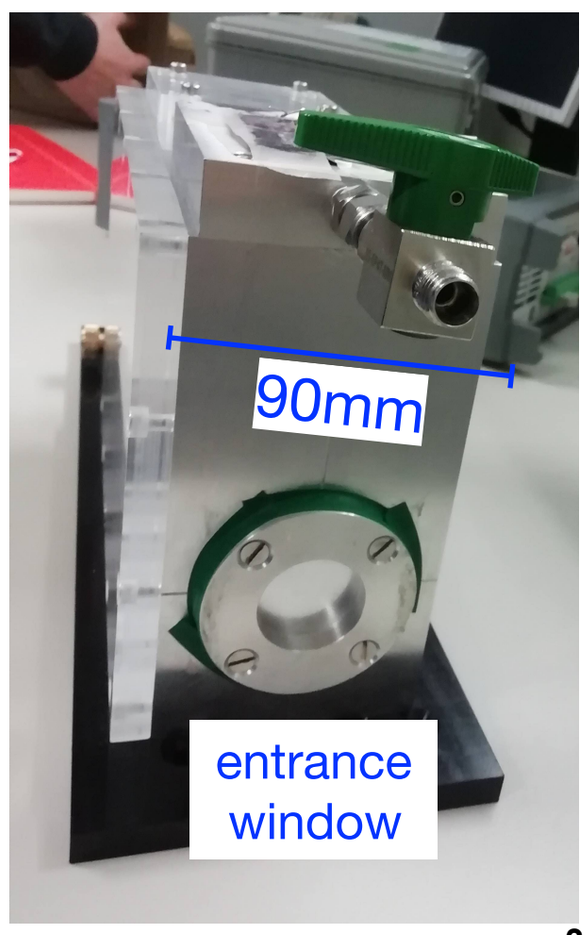
- prototype developed for ILC polarimetry
- size: 230x90x150 mm^3, weight: ~2kg
- gas Perfluorobutane (C_4F_{10})
  can be filled before, no need to have at TB, no cooling
- DAQ: stand-alone DAQ, used to run with trigger from scintillator fingers via EUDAQ TLU
  would need to synchronize with telescope



side view



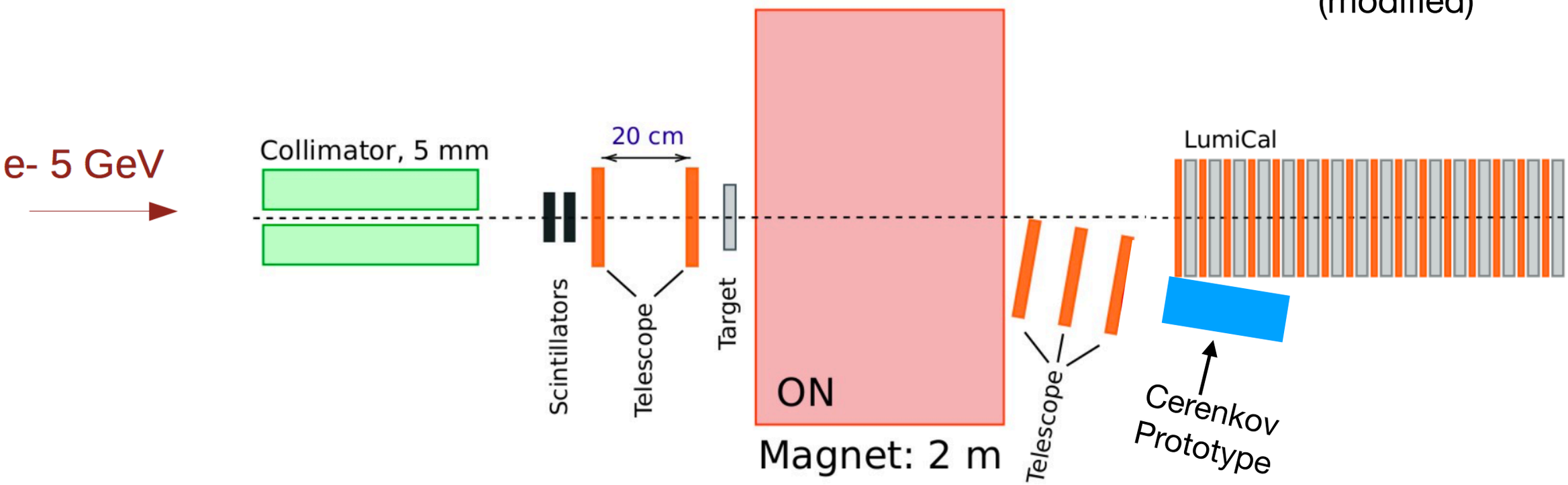
top view



front view

Proposed TB setup

Plot: O. Borysov
(modified)



- when LumiCal is measuring photons, could measure electrons
- place prototype behind Alpide telescope and synchronize
  → high-resolution spatial information from telescope,
  study detector response as function of electron position and angle
- interesting electron energy range: anything above 10MeV (gas threshold) works
- prototype: two channels of 8.5x8.5 mm^2 , total acceptance: 17x8.5 mm^2
  → expected electron energy range covered: $\Delta E \sim 1.1$ GeV