Calorimeter Beam Test

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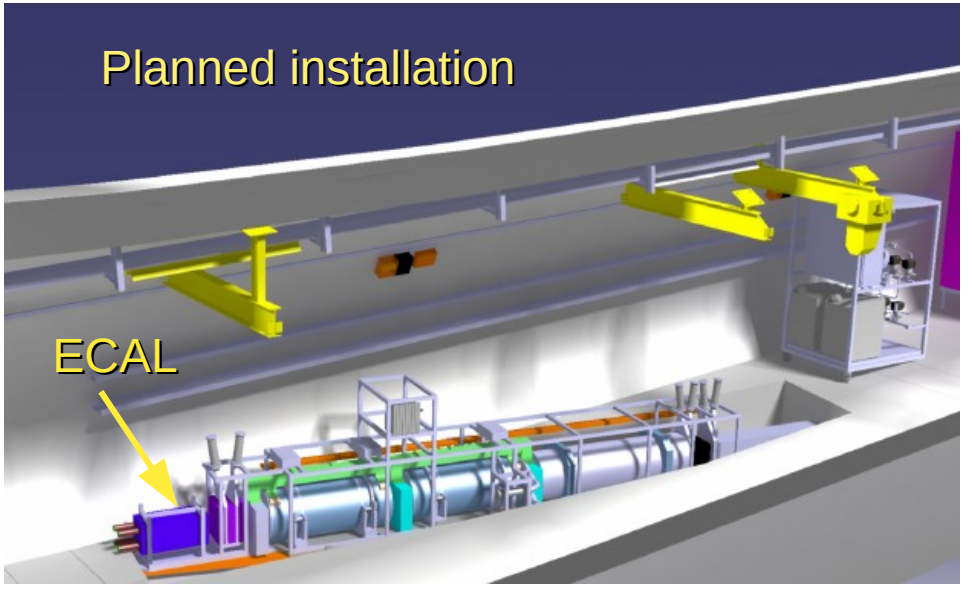
H2/H4 User Meeting

Motivation

- FASER is a small LHC experiment installed for Run 3
  - Searches for long-lived particles produced 480m upstream in IP1
- Uses 4 LHCb outer ECAL modules for calorimetry
  - Signal is e^+e^- or $\gamma\gamma$ pairs at 0.1 – 4 TeV
- Want to calibrate ECAL modules at high energy with FASER electronics
  - Scan in E, pos. and angle
- If possible, test combined running with FASER tracker station (if it will be ready)
  - Will provide precise beam position for each event



Beam Requirements

- Particles:
  - Electrons (or positrons): 80-200 GeV
    - The larger the range, the better
    - At least three different energy points
    - purity above 98% if possible
  - Muons

- Beam conditions:
  - Intensity: $<10^4$/spill (max DAQ rate ~1.5 kHz)
  - Beam spot size of a few mm
    - Can be larger if tracker is installed

Infrastructure Requirements

- Large movable table
  - Experimental setup is ~80cm wide, ~40cm high and ~1m deep
    - Tracker could be on second movable table
  - Total weight is ~250 kg (8 ECAL modules of 26 kg + tracker)
  - X/Y movements of +-15cm to scan across modules
- Scintillator veto counter behind?
- One electronics rack near table for PS crate and tracker readout electronics
- Electronics rack for VME crate and DAQ PC outside beam area
- Dry air for tracker
  - Bottle is fine as flow is low
- Space for tracker water chiller
  - Have chiller ourselves