HERD PSD @ CERN 2023

FABIO FOR THE PSD GROUP

- We plan to test a prototype of 8 bars (4 X + 4 Y)
- Each bar will be 30cm long with trapezoidal shape
 - ▶ (5cm long base and 45° angle)
 - 4 SiPM Hamamtsu S14160-3050HS (3.0x3.0mm2 50umcell) Low Z TSV Technology HV 40-41V
 - 4 SiPM Hamamtsu S14160-1315PE (1.3x1.3 mm2 15um cell) High Z HV 42-43V
 - 2 LED for calibration
 - 2 Temperature sensors
 - LSHM-S_SAMTEC Connector (20 coaxial cables)



SiPM Board



We have: SiPMs, LED, Connectors and temperature sensors The PCB are in production We need to assembly them

New Version of Beta Chip (ICCUB - Slide from David)



- Single photon resolution: SNR >5 for 10 μm microcells (> 10 for 50 μm)
- High dynamic range: >15 bits (no saturation for > 3800 firing cells)
- Maximum event rate: 10 kHz with ADC @ 50 MHz (20 kHz @ 100 MHz)
- Tuneability: preamp gain and feedback resistor, shaping time, etc
- Trigger discriminator: time resolution < 200 ps rms (100 ps rms TBC)





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Summary

- Two final version planned:
 - 16 ch for trigger/VETO detectors
 - 16 disc. outputs and serial ADC output
 - < 1.5 mW/ch (timing optimized)</p>
 - 64 ch for fiber tracker and large detectors
 - Single trigger and serial ADC outputs
 - < 1 mW/ch</p>

BETA16R2:

- Under evaluation
- Preliminary results: ok
- Radiation tolerant: preparing radiation qualification (Q3 2023)

BETA64R1:

- · Finalizing design
- Submission expected for Q3 or Q4 2023

4/26/2023



First BETA16R2 have been sent to Bari and IFAEE. Test we will start soon. 3

New DAQ from IFAE



FPGA firmware almost done

Interface PCB designed

Test we will start soon



Mechanics (GSSI)



We have all the scintillating bars and all the needed mechanics. We are designing the control units for the X-Y stages. We need to define the last details of the mechanics.

Actvity (TBD)

► PS

Beam:

- Proton (10GeV) and electron/positron (>5GeV)
- Light collection uniformity
 - Scan along X and Y (5/10 mm step)
- Readout Gain optimization (OV and BetaChip Gain)
- Trigger timing test (Trigger and VETO timing)

► SPS

▶ Beam:

- ► Fragments
- Charge resolution
 - Scan along X and Y (10/20 mm step)
- Beta Chip Dynamic gain test
- Back-splash studies
- Test of ordering in time the fired bars