Status of the AHCAL engineering prototype

FLC Meeting
November 14th, 2011
New HCAL Base Unit

- New version of HBU now fully functioning incl. SPIROC2b chip
- 2 complete systems running at DESY
- Very easy to duplicate!
- First chip tests show very good results
New Tiles

- 450 new tiles from ITEP have arrived
- Gain of 91 tiles has been tested in the “Tile Tester”
  - ~3 minutes per tile
- Out of 91 tiles:
  - One mechanically damaged
  - One not showing single pixel spectrum
  - One needed more voltage than reported
- 89/91 tiles work!

Tiles mounted below HBU
Tiles Tester results

- Single pixel spectra usually well resolved
- Gain can differ very much between SiPMs
- Good correlation between ITEP and Tile Tester measurements
- No light yield measured yet → testbeam?
Question: Can we calibrate whole slab of HBUs with current LED system and what can we learn for ILD?
First tests: HBU2 + 6 old tiles
Then: equipped half HBU2 with 72 new tiles
First tests of performance of HBU2 + SPIROC2b + SiPMs
SiPM Bias Adjustment

- Channel wise SiPM bias adjustment U[V] via DACs (up to ~5V)
  - DAC scanned for every channel
- Small steps in characteristics, but linear fit is sufficient.
- Spread between channels more severe on chip 1 than on chip 2
LED Amplitude Scan

- Extra capacitors shift LED output as expected
- Pedestal shift is an issue
- No in-depth analysis on this yet

150pF

254pF
Summary and outlook

- HBU2 plus SPIROC2b in action and working fine!
- 450 new tiles arrived and ready to be used with HBU2s
- Tile tester works fine for gain measurements
  - Confirmed results from ITEP
- LED system on HBU2 tested successfully
  - Capacitor array works fine
  - Good single pixel spectra for calibration
- Next steps of **DAQ development** ongoing to
  - use more than 2 chips simultaneously
  - use more than 1 HBU2
  - DAQ meeting last week at LLR very promising
  - Colleagues from **Mainz** joined DAQ electronics development