

Title: Performance of a LYSO crystals prototype of Electromagnetic Calorimeter

Journal: JINST

Technical note: an svn repository has been created: subdirectory “paper” of the repository already described in the TB blog:
http://blog.hep.caltech.edu/wiki/index.php/Running_analysis_code#Technical_details
Follow the same instructions replacing SuperBTB with SuperBTB/paper.

Index (splitting and numbering are only to ease discussion, not real subsections)

1. Introduction (Frank -- OK)
 - 1.1. goals of the test and SuperB project
 - 1.2. existing measurements with LYSO
2. Description of prototype
 - 2.1. Crystals (including lab-measurements) (Ren-yaun)
 - 2.2. Mechanics (Claudia)
 - 2.3. Detectors and Electronics (including power supplies)(Valerio)
3. Description of test setup
 - 3.1. Beam (David)
 - 3.2. Trigger (Paolo – OK)
 - 3.3. DAQ (including prescaling and zero suppression) (Paolo /Antonio– OK)
 - 3.3 CsI Crystals (Bertrand)

[Note: We need to decide whether we want to describe the Cherenkov, the pad behind, and the silicon. I would suggest we should not describe the silicon for sure, but I suspect the results we will show will NOT make use of the Cherenkov and the pad, so we should not describe them. We should instead describe both power supplies.]

4. Description of Simulation (Stefano)
 - 4.1. Effects included
 - 4.2. Expected breakdown of contributions on electrons
5. Selection of events (Elisa)
 - 5.1. MIPS
 - 5.2. Electrons
6. Noise studies (Marco -- OK)
 - 6.1. Observed noise level and scaling with gain (confirmed on MIPS signal) (Marco -- OK)
 - 6.2. Correlation and power spectrum studies (Marco -- OK)
 - 6.3. Comments on HV stability (RIC)
 - 6.4. PIN-APD comparison (Marco)
7. Studies on MIPS (Ric -- OK)
 - 7.1. Energy measurement (definition)
 - 7.2. Agreement with MC
 - 7.3. Resolution expected, separated between physics spread and detector resolution
8. Studies on electrons (PG)
 - 8.1. Energy measurement
 - 8.2. Intercalibration procedures (and estimate of error?)
 - 8.3. Temperature corrections
 - 8.4. Material effect (Chih-hiang)

8.5. Linearity for both gains – we should include also the MIPs point

8.6. Resolution for both gains – MIPs and electronic noise included?

[Note 1: To include the MIPs and electronic noise points for resolution we should at least study them under the same conditions as the rest, i.e. adding the energy of all channels above threshold. I think it would add value (and stability) to the fit.

Note 2: Fits should be done with free power of the statistical term, with fixed power, and with fixed coefficient from p.e./MeV]

8.7. Comparison with MC

[Note: here I would add the comment on eventual additional components needed to adjust the agreement, such as beam instability or intercalibration error]