SDHCAL-GRPC Review

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For the SDHCAL-GRPC groups

2013 activities

R&D hardware:

Detector

Design study to build a GRPC with 2 m^2 has started (IPNL, NCEPU). A special care will taken for the:
-Gas distribution system.
-Gas gap on the edges.
Contacts were taken to apply the silk-screen print method on large-surface glass plates.
Additional R&D on the gas mixture is to be done in the future.

Mechanics

-CIEMAT is conceiving a mechanical structure to host few large detectors. The structure is a self-supporting one. We are considering the possibility of using an electron-beam welding techniques (as proposed in the ILD)
-IPNL is working on the cassettes to host the large detectors. Heating dissipation will be improved.

Readout electronics

-HR3 will be extensively tested on test board (OMEGA)
-PCB to host the new ASIC and to cover 2m^2 detectors is to be conceived and then tested (IPNL)
The goal is to be able to read few large detectors with the new electronics before end of 2014

DAQ

-A board using USB2-protocol was developed and will be used on the SDHCAL prototype (IPNL). Using the DAQ2 is still envisaged if manpower and funding become available.
-A new DIF to be conceived for the HR3 and large PCB (CIEMAT+IPNL).
-We envisage to participate to the DAQ development using the g-LINK protocol in the framework of the CMS experiment and to adapt this to the future RO we develop for SDHCAL (IPNL).
-Software will be adapted to the new hardware (IPNL).

2013 activities

Software & Analyses:

-Simulation of the SDHCAL-prototype is done. Fine tuning of charge deposit simulation is to continue.

Efforts to use MOKKA structure to be evaluated and decision to be taken.

-Energy and linearity resolution using counting methods is well advanced. Different analyses are followed and they are giving similar results. MVA, NN methods are under investigation.

-Electron/pion separation is also well advanced. Two methods are used: Topological-based and FD-base. Cross-checks of the two methods is be done.

-Tracking within hadronic showers : HT, ARBOR methods are being optimized.

-Hadronic showers models comparison with data is ongoing.

-Work on separating close-by SDHCAL hadronic showers has started. This will be a major work in the coming months.

-Publication:

-An article on SDHCAL construction and commissioning is in preparation within the SDHCAL “large” community.

-Notes on Energy resolution and linearity are in preparation and then to be transformed into an article.

-Pion/electron separation note to be produced.

-Tracking within hadronic showers to be produced.

Future activities

-We don’t expect to have any TB before July 2014. However, we would like to test the large GRPC detectors when they are ready.

-We would like to have combined TB with ECAL in 2014. Use of tail catcher will be decided upon the results obtained with the November data that were taken with the “MicroMegas” tail catcher.

-We think that the next step is to prepare combined TB with other sub-detectors of ILD
as soon as ILC is on the track.