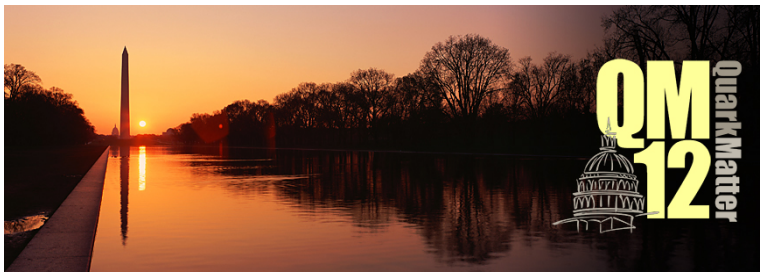

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Development of W+Si-pad/micro-pad based Electromagnetic Calorimeter for the ALICE upgrade

Thursday, 16 August 2012 16:00 (2 hours)

The W+Si electromagntic sampling calorimeter has been proposed as one of the upgrade plans for the LHC-ALICE experiment.
The role of this calorimeter is to add capabilities to measure direct photons, pi0's and jets over full azimuth in a forward rapidity region (2.5<eta<4.5).
The physics goal with the calorimeter is to understand the dynamics and properties of strongly interacting matter created by relativistic heavy-ion collisions and the initial state of the collisions such as high density color field realized at small Bjorken-x.

The W+Si sampling calorimeter is a highly segmented silicon-tungsten
calorimeter. At present, two possible designs are being considered.
One consists of three or four longitudinal sampling electromagnetic segments, where one segment is composed of 5-7 layers of tungsten (~3.5mm thickness) and 1cm x 1cm Si-pad readout. Si-pad readout is for the energy measurement. The first segment contains 2-4 longitudinal layers of high resolution Si-micro-pad (1mm x 1mm) or Si-pixel (100um x 100um) detectors for the position measurements and two gamma separation.
The other is composed of full layers of W+Si pixel with extreme fine granularity. For the Si pixel, MIMOSA chip, which has been developed as one of the Monolithic Active Pixel Sensors (MAPS), is utilized for the calorimeter purpose.

Prototypes of the W+Si-pad based calorimeter, readout analog ASICs with large dynamic range and front end module have been developed and built in 2011. The beamtest was conducted at CERN-PS in November 2011.
The overall performance obtained in this beamtest and understanding of the detector performance via simulation will be presented.
In addition to the performance evaluation, recent development of the prototype such as ASIC development and Si-micro-pad will be reported.

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