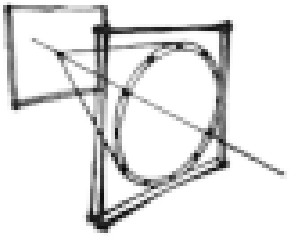

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Development of Slow Control System for the Belle II ARICH Counter

Monday 5 September 2016 17:25 (15 minutes)

The Aerogel Ring Imaging Cherenkov (ARICH) counter is the particle identification device covering the end-cap region in the Belle II detector. As a Cherenkov photon sensor a position-sensitive Hybrid Avalanche Photo-Detector (HAPD) will be used. In total 420 HAPDs will be arranged to cover the endocarp area. To operate HAPD six power lines with different voltages are needed. Negative voltage of $\sim 7kV$ is applied to tube to accelerate photoelectrons, a different reverse voltage ($\sim 300V$) is applied to each of the four APD chips (to equalize their avalanche gains), and a voltage of $\sim 200V$ is needed for the APD guard ring. In total this result in 2520 voltage channels that must be controlled in a reliable manner. For this purpose, slow control system has been developed. This system is composed of two major functions, one is to control the power supplies, the other is for configuration of the readout electronics.

The control system of the power supply should communicate with the Belle II central data acquisition system (DAQ), and therefore some utility functions, which are widely used in the Belle II system, are employed. We implement a power supply control software as a network based remote system to set/get parameters and error messages via NSM2, a network IPC framework in the Belle II DAQ system.A prototype system corresponding to one-sixth scale of ARICH power supply was built and operations of this prototype have been studied in detail to establish the stable control. As a result, we concluded that it is possible to expand this system to operate all channels for the ARICH counter.

For the readout of the HAPD, front end board (FEB) is directly connected to an HAPD. Output data from five or six FEBs are sent to one merger board. The merger board is connected to Belle DAQ system via Belle2Link, the common framework of detector readout. All configuration for the FEBs and the merger boards can be controlled though the Belle2Link.

Registered

Yes

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