Contribution ID: **502** Type: **Poster presentation**

A High Precision Signals Readout System for Micromegas Detector Based on the VMM

Thursday 14 June 2018 15:50 (15 minutes)

Micromegas detector is a gas detector with parallel plate structure, and it consists of a conversion gap in which radiations liberate ionization electrons and a thin amplification gap. The signal of the micromegas detector consists of two parts: the electron peak and the ion tail. The electronic signal just keeps few nanoseconds, which is used for precise time measurement. The ion signal carries most of the signal energy, and it is used to reconstruct particle energy. The micromegas detector has the advantages of high counting rate, high gain, good time resolution and position resolution, excellent radiation-hardened performance, large sensitive area and readout convenience. This paper introduces a signals readout electronics system for micromegas detector based on VMM chips. The VMM is the front end ASIC to be used in the front end electronics readout system of both the micromegas and sTGC detectors of the New Small Wheels Upgrade project. The VMM is designed by Brookhaven National Laboratory, and each chip is composed of 64 linear front-end channels. Each channel integrates a low-noise charge amplifier (CA) with adaptive feedback, test capacitor, and adjustable polarity (to process either positive or negative charge). Based on those characteristics, the VMM is applicable for the signals readout system of multichannel detectors. The readout system consists of three parts: the front-end board, the data acquisition board, and the host computer with the control software.

Minioral

Yes

Description

DAQ board

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Session Classification: Poster 2

Track Classification: Data Acquisition