

Upgrade of the SND electromagnetic calorimeter

Wednesday, 27 November 2019 12:20 (20 minutes)

Current status and last results of the SND calorimeter upgrade are described. The main part of SND detector is a three-layer spherical NaI(Tl) electromagnetic calorimeter (EMC). The total thickness of NaI(Tl) in the calorimeter is 35 cm. The vacuum phototriodes (VPT) are used as photosensitive devices for the calorimeter counters. The quantum efficiency of VPT is about 15 %, the average gain is 10, and the light collection efficiency is about 10%.

New spectrometric channel of the electromagnetic calorimeter (EMC) was designed and implemented. It consists of a NaI(Tl) crystal, a vacuum phototriode, a charge-sensitive preamplifier a shaper and digitizing modules. The digitization is performed by 6 ADCs AD9228BCPZ-40 (4 channel, 12 bits, 40 MBPS) and the data go in serial form to the SoC Xilinx Zynq-7000. This SoC is basically a combination of FPGA programmable logic and ARM processor.

The special algorithm for signal waveform processing was developed to determine time of flight and amplitude with high time (1 ns) and amplitude (250 keV) resolution. The algorithm is based on the invariability of the signal waveform. The waveform calibration procedures are developed and implemented.

Successful data taking run was performed with upgraded EMC in 2019.

Primary author: SURIN, Ilya (Budker INP)

Presenter: SURIN, Ilya (Budker INP)

Session Classification: Running performance, upgrade