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Scintillator strip detector with MRS APD readout for the Super BELLE

We propose a muon system for the Super BELLE based on scintillator counters with wave-length-shifting fibers, read out by metal-resistor silicon avalance photodiods operating in the Geiger mode (MRS APD) produced by CPTA (Moscow). We produced 150 scintillator strips and MRS APDs to be installed in the BELLE environment for the background measurement and long term stability study. Here we report the results of their tests performed at ITEP. Using weak flashes of a Light Emitting Diode we clearly see individual photoelectons in the amplitude spectrum of the MRS APDs and measure the relative quantum efficiency, the gain and the cross-talk of the MRS APDs. We present the dependence of the main characteristics on High Voltage. Using a cosmic setup we find the light yield of the strips, measure the efficiency and time resolution. Using a hadron beam at ITEP Proton Synchrotron we study the light yield uniformity in the longitudinal and transversal directions. The first measurement of the radiation hardness using proton beam are presented.

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