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Beam test results of triggerless pixel prototypes for the PANDA MVD

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The PANDA experiment will make use of cooled antiproton beams at the future FAIR facility. The physics goals dictate basic requirements to the Micro Vertex Detector of the experiment such as the capability to resolve secondary vertices of short-lived particles, limited material budget, additional information to the global PID by energy loss measurement. Continuous readout and radiation tolerance are additional requests to the MVD, composed of thinned epitaxial silicon pixel and double sided silicon microstrips arranged in an asymmetric layout of four barrels around the interaction point and six forward disks. Thinned epitaxial silicon pixel assemblies (100umx100um each pixel) read out by ToPix_3 ASICs, developed in the 130 nm CMOS technology, have been tested at CERN-T9. The circuit is triggerless and then the channels are able to detect signals and transmit the information with a precise time stamp, including the energy loss measurement using the Time over Threshold technique. A single assembly was studied at several rotation angles using a strip tracking telescope, and a dedicated pixel tracking station, composed of four pixel planes, allowed to study the assembly performance in terms of residuals and efficiency, developing dedicated algorithms based on time windows to select hits belonging to the same event. 100 um and 150 um epitaxial silicon sensors were studied and an assembly pre-irradiated with neutrons was tested too. The results will be presented.

quote your primary experiment

PANDA

Author: CALVO, Daniela (INFN-Torino (IT))

Co-authors: FILIPPI, Alessandra (INFN (IT)); RIVETTI, Angelo (INFN (IT)); Dr DE MORI, Francesca (Universita' and INFN-Torino (IT)); MAZZA, Gianni (INFN (IT)); ZAUNICK, Hans (HISKP Universitat Bonn); Prof. BRINKMANN, Kai-Thomas (Justus-Liebig Universitat Giessen); ZOTTI, Laura (Universita' and INFN-Torino (IT)); DE REMIGIS, Paolo (INFN (IT)); Dr WHEADON, Richard (INFN (IT)); SCHNELL, Robert (Justus-Liebig-Universitaet Giessen (DE)); BIANCO, Simone (HISKP Universitata Bonn); Prof. MARCELLO, Simonetta (Universita' and INFN--Torino (IT)); QUAGLI, Tommaso (Justus-Liebig-Universitaet Giessen (DE))

Presenter: CALVO, Daniela (INFN-Torino (IT))

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