

Test beam studies of the GasPixel Transition Radiation detector prototype.

Friday, 16 September 2011 12:10 (20 minutes)

F. Hartjes, M.Fransen, W. Koppert, S.Konovalov, S.Morozov, N. Hessey, A.Romaniouk, M. Rogers, H. van der Graaf.

A combination of a pixel chip and a gas chamber opens new opportunities for particle detectors. These “GasPix” detectors have vector tracking features offering at the same time L1 track trigger and particle identification using transition radiation and dE/dX measurements.

Test beam and MC studies of tracking and particle identification properties have been performed with a Grid-Pix prototype.

The properties of the detector very much depend on the gas mixture. For one layer of the GasPix detector one can obtain a special accuracy down to $11\text{ }\mu\text{m}$ and a vector angular accuracy of about 10 mrad for a beam incident angle of 10° .

For particle identification studies the detector was filled with a Xe/CO₂(70/30) mixture. A block of transition radiation radiator of 18 cm was installed in front of the detector. The pion rejection power using both cluster counting and full dE/dX methods was studied. It was shown that for 5 GeV particles a single layer of the detector gives a pion suppression by about a factor of 7 at an electron efficiency of 90%. Two layers of this detector provide a pion rejection factor of 50 at 90% electron efficiency. A detailed comparison with MC is presented.

Primary author: Dr ROMANIOUK, Anatoli (MEPHI/CERN)

Presenter: Dr ROMANIOUK, Anatoli (MEPHI/CERN)