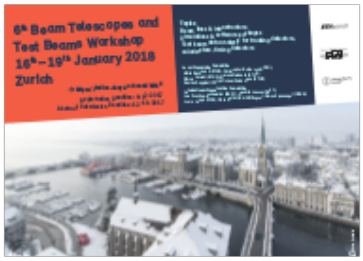

Contribution ID: **31** Type: **not specified**

Test beam results of planar GEMs with analog and time readout in strong magnetic field and very high rate

Friday 19 January 2018 09:00 (20 minutes)

Particle detection is one of the pillars of the research in fundamental physics. Since several years, a new concept of detectors, called Micro Pattern Gas Detectors (MPGD), allows to overcome many of limits the preexistent detectors, like drift chambers and microstrip detectors, reducing the discharge rate and increasing the radiation tolerance.

Among these, one of the most commonly used is the Gas Electron Multiplier (GEM). GEMs have become an important reality for fundamental physics detectors. Commonly deployed as fast timing detectors and triggers, due to their fast response, high rate capability and high radiation hardness, they can also be used as trackers.

A series of test beam has been performed in order to characterize the behavior of 10x10 cm2 triple-GEMs and to assess the spatial resolution performance with analog readout with and without magnetic field at H4 line in CERN North Area. The presence of a strong magnetic field distorts the avalanche propagation in the gas and thus the conventional charge centroid readout performance is limited to more than 400 μm. To overcome this limit, a new readout technique based on the time of the arrival of the inducted signal on the strip was developed: since it uses a concept similar to the one of the Time Projection Chambers, but the drift gas is only few millimiters, this readout technique is called u-TPC.

This new technique uses the information of time of arrival and drift velocity to extract the position. The high rate increases the number of ions inside the gaps that can eventually distort the drift fields and thus the drift velocity. To test up to which rate the uTPC readout holds, a further test beam was performed at Mainzer Microtron (MAMI), in Mainz.

In this contribution, the results of the two different test beam will be presented with a particular focus on the uTPC readout results in magnetic field and on the high rate test in Mainz.

Primary authors: Dr CIBINETTO, Gianluigi (INFN Ferrara); Mr MEZZADRI, Giulio (INFN Ferrara); Mr FARINELLI, Riccardo (INFN Ferrara)

Presenter: Mr FARINELLI, Riccardo (INFN Ferrara)

Session Classification: Analysis