QUARK MATTER 2015
Sep. 27 – Oct. 3, 2015 Kobe, Japan

Contribution ID: **610** Type: **Poster**

Combined Gas Electron Multipliers and MicroMeGas as Gain Elements in a High Rate Time Projection Chamber.

Tuesday, 29 September 2015 16:30 (2 hours)

A new generation of Time Projection Chamber (TPC) has been proposed for an ALICE (A Large Ion Collider Experiment at CERN) upgrade for continuous readout at high luminosity. Such a continuously sensitive high-rate imaging detector is also highly desirable as a central tracking detector for a future electron-ion collider and a linear electron collider. This device would rely on the intrinsic ion back flow (IBF) suppression of micro-pattern gas detectors to minimize space charge build-up in the main drift volume and thus would not require the standard gating grid and the resulting intrinsic dead time. We have proposed, simulated, and measured the properties of a combination of a MicroMeGas (MMG) detector with two Gas Electron Multipliers (GEM) for this application. We have measured the positive ion backflow (IBF) and energy resolution of this structure at various settings of the gains of the elements and electric field between the elements with different working gases. At a gain of 2000, this configuration allows achievement of both an ion back-flow below 0.4% and an energy resolution better than 12% (standard deviation) for 55Fe x-rays. Spark rates measured for a variety of conditions also will be presented.

On behalf of collaboration:

ALICE

Primary author: HARRIS, John William (Yale University (US))

Presenter: HARRIS, John William (Yale University (US))

Session Classification: Poster Session

Track Classification: Future Experimental Facilities, Upgrades, and Instrumentation