

A UV sensitive integrated Micromegas with Timepix readout

Tuesday, 16 February 2010 17:45 (25 minutes)

We present an imaging system consisting of a Timepix charge sensitive readout with an integrated Micromegas detector. The Al grid is supported by SU-8 pillars, this structure is post-processed directly onto the Timepix chip. The detector is made UV sensitive by evaporating a 200 nm thick reflective CsI photocathode onto the Al grid. With this technology we can create a monolithic imaging system capable of detecting single photons with a very high resolution.

After 3 weeks of continuous measurements the devices did not show degradation. Best results were obtained in He/isobutane (80/20). Extraction efficiency of photoelectrons from CsI into He/isobutane was measured; it reaches 50 %. Pulse height spectra were recorded from the grid under UV illumination. The distribution follows $P(Q) \propto \exp(-Q/G)$. The gain curve is extracted from exponential fits to the UV pulse response; maximum gain was $6.2 \cdot 10^4$ at 575 V (72 kV/cm). Many images were recorded using various shadow-masks. The sharp transitions from dark to light regions indicate subpixel resolution (pixel size is 55 μm).

We conclude that combining Timepix with integrated Micromegas and CsI is successful. Many different aspects are currently under investigation such as the spatial resolution and the spectroscopic performance of this detector. This is possible by using the charge sensitive TOT readout mode.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

<http://cid-09803fefa87f3eb5.skydrive.live.com/self.aspx/.Public/VCI2010/VCIabstractJMv2.pdf>

Primary author: Mr MELAI, Joost (MESA+ institute, University of Twente)

Co-authors: Prof. BRESKIN, Amos (Weizmann institute of Science); Dr SALM, Cora (MESA+ institute, University of Twente); Dr VAN DER GRAAF, Harry (NIKHEF); Dr VISSCHERS, Jan (NIKHEF); Prof. SCHMITZ, Jurriaan (MESA+ institute, University of Twente); Mr CORTESI, Marco (Weizmann institute of Science); Mr FRANSEN, Martin (NIKHEF); Dr BLANCO CARBALLO, Victor (MESA+ institute, University of Twente); Dr BILEVYCH, Yevgen (NIKHEF)

Presenter: Mr MELAI, Joost (MESA+ institute, University of Twente)

Session Classification: Gaseous Detectors 4