Contribution ID: **226** Type: **Oral Presentation**

Study of the ageing properties of construction materials for High Rate Gas Detectors

Thursday, 9 June 2011 15:10 (20 minutes)

In this article we would like to present the study of the ageing properties of construction materials for the Multi Wire proportional Chamber (MWPC). This work is a part of the detector R&D of the CBM experiment at FAIR. CBM will use several gas detectors at high interaction rates. The construction materials for the production of the detectors have to be chosen properly in order to ensure the operation of the detector over the projected lifetime of the experiment. Deterioration of the detectors´ performance ("ageing") is a serious problem for gas detectors in high rate experiments [1].

An infrastructure has been set up at the GSI detector laboratory to study the ageing properties of the gas filled detectors such as MWPC, GEM etc. In this set-up a standard wire chamber is continuously purged by gas through an out-gassing box at a given flow rate. The box contains the construction materials under investigation, e.g. glues etc. The ageing of wire chambers has been studied by irradiating the chamber with an X-ray generator for a certain interval of time and comparing the pulse height spectra of a 5.9 keV 55Fe X-ray source of that chamber and another reference chamber, connected to the same gas line upstream the out-gassing box. Details of the experimental set-up and the results will be presented.

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Session Classification: Gaseous Detectors

Track Classification: Gaseous Detectors