Contribution ID: **487** Type: **Poster**

Low-pressure TPC with THGEM readout for ion identification in Accelerator Mass Spectrometry

A new technique for ion identification in Accelerator Mass Spectrometry (AMS) has been proposed based on measuring the ion track ranges using a low-pressure time projection chamber (TPC). As a proof of principle, the low-pressure TPC with charge readout using a THGEM multiplier was developed. The tracks of alpha-particles from various radioactive sources were successfully recorded in the TPC. The track ranges were measured with a rather high accuracy, reaching 3%. Using these results and SRIM code simulation, it is shown that the isobaric boron and beryllium ions can be effectively separated at the 10 sigma level. This technique is expected to be applied in the AMS facility in Novosibirsk for dating geological objects, in particular for geochronology of Cenozoic Era.

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Session Classification: Poster Session A

Track Classification: Gaseous Detectors