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Low-pressure TPC with GEM readout for experiments with low energy ion beams

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At Accelerator-based Mass Spectrometer (AMS) in Novosibirsk, there is a problem to separate isobar ions of different chemical elements that have the same atomic mass. The typical example is radioactive isotopes 10Be and 10B that are used to date geological objects at a time scale of a few million years.
To solve this problem we have developed and successfully tested a low-pressure Time Projection Chamber (TPC) with Gas Electron Multiplier (GEM). The idea behind this development is to measure the length of the ion's track until it comes to a stop and the energy it releases in the chamber volume. The TPC was successfully manufactured and its characteristics were studied in iso-butane at low pressures using alpha particles of different energies. Using results of the TPC tests and the SRIM code simulation, it was shown that it is possible to efficiently separate isobaric boron and beryllium ions at a nominal pressure of 50 Torr. The chamber was then installed on the AMS and successfully tested on 14C beam.
Based on this technology, a TPC with the optical readout, using the highly sensitive video camera.
The latest results f this work will be presented in my presentation.

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