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Low-pressure Time Projection Chambers for Experiments with Low-energy Ions

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A series of low-pressure time-projection chambers for experiments with low-energy ions is being developed at the Budker Institute of Nuclear Physics. The development of the series began with the creation of a test chamber with the GEM based readout for the separation of ions by measuring the stopping range in the gas medium. This detector is designed to upgrade the accelerator based mass-spectrometer (AMS) to be able to separate isobaric ions. At present, the dedicated TPC has been successfully tested and is ready for installation on the AMS. The recent results of a new ion identification method will be presented. Based on the experience gained, we plan to upgrade the TPC to use an optical readout. This method allows achieving good spatial resolution along with high time resolution. Successful implementation of this technique will make it possible to carry out series of interesting experiments, in particular, the study of the Migdal effect and the measurement of the cross section for the thermonuclear reaction proton - boron 11. Preliminary results and some details will be discussed in the presentation.

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