Anomalous Ambipolar Trapping at Intermediate Collision Frequencies\textsuperscript{1} ALEXEI BEKLEMISHEV, PETER BAGRYANSKY, VLADIMIR MAKSIMOV, Budker Institute of Nuclear Physics, DMITRIY SKOVORODIN, Novosibirsk State University, VADIM PRIKHODKO, Budker Institute of Nuclear Physics, GDT TEAM — Unexpectedly high suppression of axial losses by the ambipolar plug has been observed during compact-plasmoid experiments in the Gas Dynamic Trap. Suppression exceeded factor of 5, while the ambipolar potential was only of the order of 0.5 of the ion and electron temperatures. Meanwhile, theories of ambipolar plugging for both collisional and weakly collisional plasmas predict much smaller effect. Our explanation is based on the fact that the GDT operates in the transitional regime from the gas-dynamic to the standard mirror confinement, i.e., the mean free path is of the order of the length of the trap. It means that the loss cone is full for low-energy particles, and almost empty for particles above temperature. Even a low-potential barrier is able to trap the low-energy ions, hence, application of such barrier effectively drives the trap into the standard-mirror regime with an empty loss cone, i.e., with much lower axial losses. The poster will contain experimental data, simplified analytic theory, and a full kinetic simulation of ambipolar axial confinement at intermediate collision frequencies.

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