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Expansion of a plasma plume with pulsed electron neutralization LUI HABL, Laboratoire de Physique des Plasmas (LPP) / ThrustMe, TREVOR LAFLEUR, DMYTRO RAFALSKYI, ANE AANESLAND, ThrustMe, PASCAL CHABERT, Laboratoire de Physique des Plasmas (LPP) — Plasma plumes produced by gridded ion sources are generally neutralized by an external electron source which provides a continuous current that maintains quasi-neutrality in the plume and charge balance of the source. Recently, a new neutralization technique was developed, based on radio-frequency biasing of ion acceleration grids, which allows the extraction of electrons from the same plasma source as the ions, and their injection into the plume in short pulses. The effects of pulsed neutralization on the plume expansion are still not well understood, but experiments have shown the presence of a strongly anisotropic and high-temperature electron population, in contrast with common gridded ion sources. As a first approach to understand the phenomena involved in this type of neutralization, we make use of a two dimensional particlein-cell (PIC) code to analyze the plume with pulsed neutralization. We present a comparison between the expansion from the pulsed neutralization scheme and conventional DC ambipolar expansion, before performing a detailed parametric study analyzing the influence of the pulse frequency and magnitude, and the capacitance between the source and outer surrounding boundaries.

> Lui Habl Laboratoire de Physique des Plasmas (LPP) / ThrustMe

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