

Abstract Submitted
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Ionization and acceleration of molecular constituents in a Hall thruster operating with xenon/air and xenon/nitrogen mixtures. MARK CAPPELLI, Stanford University, ANTONIO GURCIULLO, ANDREA LUCCA FABRIS, University of Surrey — The ion plume of a 70-mm diameter Hall Effect Thruster operated on mixtures of xenon/nitrogen and xenon/air is investigated by means of a Wien filter (E x B probe). The dependence of the velocities of the plume ions on the operating parameters of the thruster (anode voltage, anode power, mass flow rate and magnetic field) is explored. The most probable ion acceleration voltages, the ion current and density fractions of the multi-propellant, multi-species ion beam, are computed from the Wien filter spectra through a dedicated post-processing analysis. The knowledge of these properties is fundamental for understanding the contribution of each ion species to the propulsive performance metrics of the thruster when operated on these molecular gas mixtures. One finding that will be discussed in this poster is that the constituent air ions in an air/Xe mixture appear to form at a higher potential than that at which ions of Xe are formed, suggesting perhaps that additional metastable kinetics may be playing a role in their formation.

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