

Abstract Submitted
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Creation of Ion-Ion Plasmas through Magnetic Filtering¹ DENNIS GERST, STÉPHANE MAZOUFFRE, ICARE CNRS Orleans, France, ICARE CNRS ORLEANS, FRANCE TEAM — The market for electric space propulsion is constantly growing and is dominated by two types of thrusters, the gridded ion engine and the Hall effect thruster. Both thrusters are propelled by electropositive plasmas with a recombination length of several hundred meters which leads to interaction and contamination of the space vehicle. A new kind of thruster has been suggested and patented by P. Chabert. The PEGASES thruster (Plasma Propulsion with Electronegative GASES) uses an ion-ion plasma, which means an electron free plasma, as propellant. The contamination of the spacecraft can be reduced drastically, due to the short recombination length between negative and positive ions. To create ion-ion plasmas it is necessary to use strongly electronegative gases such as SF₆ or Oxygen. In order to create negative ions a magnetic field is used to trap and subsequently cool down the electrons so that they can attach to the neutral molecules. In this work different magnetic field configurations, as radial, axial and cusp field in various field strengths, have been investigated, in an inductive RF discharge, with the means of Langmuir probes.

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