Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Experimental results of an iodine plasma in PEGASES gridded thruster[1] PASCALINE GRONDEIN, ANE AANESLAND, Laboratoire de Physique des Plasmas - CNRS - UMPC — In the electric gridded thruster PEGASES, both positive and negative ions are expelled after extraction from an ion-ion plasma. This ion-ion plasma is formed downstream a localized magnetic field placed a few centimeters from the ionization region, trapping and cooling down the electron to allow a better attachment to an electronegative gas. For this thruster concept, iodine has emerged as the most attractive option. Heavy, under diatomic form and therefore good for high thrust, its low ionization threshold and high electronegativity lead to high ion-ion densities and low RF power. After the proof-of-concept of PEGASES using SF6 as propellant, we present here experimental results of an iodine plasma studied inside PEGASES thruster. At solid state at standard temperature and pressure, iodine is heated to sublimate, then injected inside the chamber where the neutral gas is heated and ionized. The whole injection system is heated to avoid deposition on surfaces and a mass flow controller allows a fine control on the neutral gas mass flow. A 3D translation stage inside the vacuum chamber allows volumetric plasma studies using electrostatic probes. The results are also compared with the global model dedicated to iodine as propellant for electric gridded thrusters.

[1]This work has been done within the LABEX Plas@par project, and received financial state aid managed by the Agence Nationale de la Recherche, as part of the programme "Investissements d'avenir."

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Date submitted: 16 Jun 2015 Electronic form version 1.4