Abstract Submitted
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Experimental characterization of a magnetized ICP source used as the first stage of an Inductive Double-stage HALL Thruster (ID-HALL)[1] FREDDY GABORIAU, LOIC DUBOIS, ALEXANDRE GUGLIELMI, LAURENT LIARD, JEAN-PIERRE BOEUF, LAPLACE, GREPHE TEAM — The new generation of all-electric propulsion satellites requires multimode thrusters able to provide high thrust for orbit transfer and high specific impulse for satellite station keeping. In conventional Hall thruster, the same electric field provides electron energy for ionization and controls the ion acceleration, thus thrust and specific impulse are closely linked. The concept of double-stage Hall thruster (DSHT), where ionization is separated and controlled independently from ion acceleration, allows separating thrust and specific impulse. This concept raises fundamental questions and the challenge is to obtain a high degree of ionization in the first stage and an efficient extraction of the ions from the ionization region to the acceleration stage. To address this issue, a new concept of DSHT called ID-HALL is proposed. The ionization stage is a cylindrical ICP source with a closed magnetic circuit (confining the plasma and reducing ion losses) and is magnetically connected to the standard Hall acceleration stage. Results regarding the efficiency of the ICP source with and without the closed magnetic circuit will be presented and discussed based on the determination of the electron density and the electron temperature using single and double probes.

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