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Experimental characterization of a new design of double stage Hall Thruster, ID-Hall: relevance of the concept FREDDY GABORIAU, LOIC DUBOIS, ALEXANDRE GUGLIELMI, JEAN-PIERRE BOEUF, LAPLACE CNRS Universite de Toulouse, GREPHE TEAM — 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. The challenge is to obtain a high degree of ionization in the first stage, an efficient extraction of the ions from the ionization region to the acceleration stage with limited charged particle losses. To address this issue, we propose a new concept of DSHT called ID-Hall (Inductive Double-stage HALL Thruster) where the ionization stage is a cylindrical magnetized RF source placed inside the inner cylinder and magnetically connected to the standard Hall acceleration stage. ID-Hall thruster will be presented and characterized both in single stage mode and double stage mode by measuring plasma density, electron temperature, total extracted ion current and ion energy distribution function in the plume of the thruster. Finally, the relevance of the DSHT concept will be discussed.

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