Abstract Submitted
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Development of the Small Helicon Magnetoplasma Thruster (SHMAPT)[1] CELSO RIBEIRO, JORGE ANDRES-DIAZ, RALPH GARCIA-VINDAS, ELIAN CONEJO, GERARDO PADILLA-VIQUEZ, ALEXIS DEVITRE, Centro de Investigacion en Ciencias Atomicas Nucleares y Moleculares, Universidad de Costa Rica, ESTEBAN AVENDANO, Escuela de Fisica, Universidad de Costa Rica, EDUARDO CALDERON, LEONARDO LESSER-ROJAS, Escuela de Ingenieria Mecanica, Universidad de Costa Rica — Magnetoplasma-based electric rocket devices are envisaged to be used for the same tasks as those of ion thrusters (e.g. satellites' orbital correction). So far, the electrodeless types seem as the only feasible way to lead manned missions into deep space. We have constructed a small helicon magnetoplasma thruster (SHMAPT) to study the physics of helicon plasma (e.g. the double helicon structure) and its relation with the thrust, specific impulse, and the plasma-wall interaction, using a variety of gases. Diagnostic developments have been planned using Mach and Langmuir probes, strain-gauges, and light emission spectroscopy. SHMAPT is composed by a water-cooled cooper helicon antenna (6 cm length, 2.6 cm diameter) mounted onto a sapphire tube (1.5 mm thickness, 2.5 cm external diameter, 40 cm length). The antenna is coupled to a commercial 13.56 MHz source with variable power (initially up to 600 W and later up to 5 kW). Two NdFeB permanent magnets, each of 0.24 T, are fitted at the extremities of the antenna. This structure is assembled into a square 0.07 m^3 high vacuum chamber pumped by a 50 l/s turbo pump backed by a 2.5 m^3/h diaphragm pump. Preliminary results will be presented.

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