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The Concept of the Pinch Helicon Magnetoplasma Thruster CELSO RIBEIRO, Institute of Physics of the University of Brasilia — A new concept of a high efficient electrodeless magnetoplasma-based electric thruster using a helicon plasma submitted to a pinch effect is proposed. This concept is intended to have high thrust for a short period, while reducing the plasma-wall contact. This proposal is highly suitable for rocket devices for faster satellites' orbital correction, a feasible way to lead manned missions into deep space, and for a more compact plasma sources for plasma materials for fusion studies. The pinch effect is created by a set of poloidal field coils placed around the insulating cylinder where the helical antenna is mounted. A pulsed current creates the pinch effect, which immediately insulates the plasma to the wall, thus reducing the perpendicular particle and energy losses. As a consequence, the axial flux, thus the thrust, should be increased because of particle balance. This may require an additional magnetic field produced by a single coil placed at the back of the helicon antenna (the gas entrance) to be acted during the pinch phase, leading to an unbalanced magnetic mirror-type configuration, therefore a net flux outwards. The combination with the double helicon structure may also maximize the efficiency. If everything is synchronized, there will be no gas or energy wasted, and the wall heat will be minimal, thus reducing the problems of material fatigue and failures, and making feasible the use of conventional materials.

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