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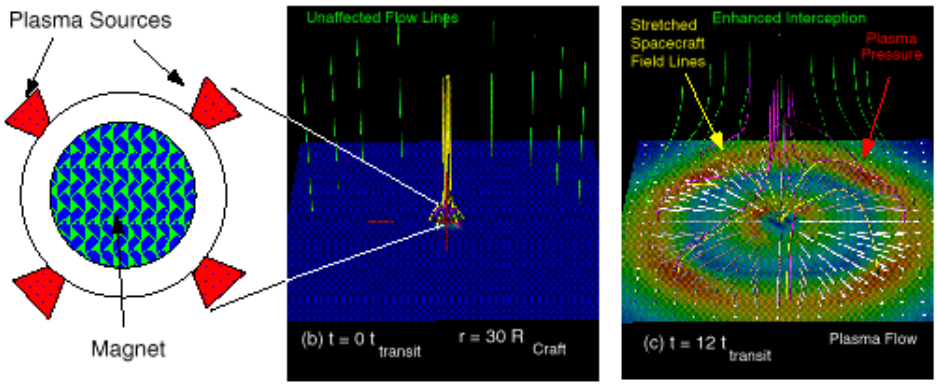
"The Mini-Magnetospheric Plasma Propulsion, M^2P^2"

The Mini-Magnetospheric Plasma Propulsion, M^2P^2, system provides a revolutionary means for spacecraft propulsion that can efficiently utilize the energy from the space plasmas to accelerate payloads to much higher speeds than can be attained by present chemical oxidizing propulsion systems. The system utilizes an innovative configuration of existing technology based on well established principles of plasma physics. It has the potential of feasibly providing cheap, fast propulsion that could power Interstellar Probe, as well as powering payloads that would be required for a manned mission to Mars. As such, the proposed work is for missions out of the solar system and between the planets.



The project is interdisciplinary involving space science, plasma engineering and aeronautics and space transportation, which are key components of NIAC's program. The M^2P^2 system utilizes low energy plasma to transport or inflate a magnetic field beyond the typical scale lengths that can be supported by a standard solenoid magnetic field coil. In space, the inflated magnetic field can be used to reflect high-speed (400 – 1000 km/s) solar wind particles and attain unprecedented acceleration for a power input of only a few kW which can be easily achieved by solar electric units. Our initial estimates for a minimum system can provide a typical thrust of about 3 Newton continuous (0.6 MW continuous power), with a specific impulse of 10^4 to 10^5s) to produce an increase in speed of about 30 km/s in a period of 3 months. Proposed optimization could allow the development of system that increase the acceleration with less expenditure of fuel so that a mission could leave the solar system could become a reality.