Ion Rockets

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In order to usher in a new era of space travel, we need a new mode of ship propulsion — Ion Rockets. These ships will be equipped with two systems that work together, the reactor, and the ion drive. The reactor will be a magnetic confinement Tokomak that heats deuterium gas up to 400 million degrees Kelvin in order to run D-D-T fusion. The ion drive will be a set of linear ion accelerators that use xenon gas as the propellant.

Unlike traditional chemical rockets which employ a unary propulsion mode, ion rockets will employ a binary system whereby the reactor generates electric power, and transfers this power to the ion accelerators via electric cables.

The advantages of Ion Rockets over Warp Drive come from Newton's Laws of Motion: when the ion drive accelerates the propellant and ejects it out of the nozzles, an equal and opposite force accelerates the ship forward. When the ship reaches the desired velocity, the ion drive can be turned off, and the ship can use its momentum to coast forward. The Inertial Field of Space provides the necessary framework for the ship's inertia to carry it forward. In order to decelerate, the ship can eject the propellant in the obverse direction.

Ion Rockets can travel anywhere that the Inertial Field exists, and that's anywhere in the Universe. Specifically, these ships can travel above the galactic plane. This will allow for intergalactic travel. Theoretically there's almost no limit to the speed which these ships can accelerate up to. Calculus teaches us that velocity is the first derivative of motion, and acceleration is the second derivative. The equation F = ma shows us that the ship's momentum, mv, is the integral of the force acting on it (from the ion drives).