

SPACE PROPULSION SYMPOSIUM (C4)
Advanced Propulsion : Non Chemical, Non Electric (6)

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THRUST DEPENDENCY OF THE MICROWAVE ROCKET ON MICROWAVE POWER DENSITY
AND AMBIENT PRESSURE**Abstract**

Microwave Rocket is our original concept for future low-cost launch system, which has a focusing reflector and a cylindrical body, and thrust of which is generated by blast wave caused by microwave power input from outside of the body. The blast wave is driven by propagation of ionization front sustained by microwave. Thrust dependency on microwave power density and ambient pressure is important to design the Microwave Rocket vehicle. An experiment under conditions of each ambient pressure, 0.1-1.0 atm, and microwave power density was conducted. In this study, 170 GHz high power gyrotron was used as a microwave source. Impulsive thrust was deduced by pressure history near thrust wall. As a result, momentum coupling coefficient, which is the ratio of thrust impulse and input energy, increased while ambient pressure or power density increased, but it had a roof suggesting the limit of the value. This result indicates some parts of the optimum conditions to operate Microwave Rocket vehicles.