Paper ID: 36492
student

Poster Session (P)
Poster Lunch (1)

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RESEARCH ON THE MICRO-THRUST MEASUREMENT METHOD BASED ON THE PRINCIPLE OF ELECTROMAGNETIC TORSION BALANCE

Abstract

This article describes a micro-thrust measurement method based on the principle of electromagnetic torsion balance. The micro-thrust automatic measurement system based on this method can measure the thrust of the thruster effectively such as the electric rocket and the stationary plasma thruster. When measuring, the thruster installed in the measurement system will produce the thrust which can produce the torque to the pivot. Then, the torque will be balanced immediately with the electromagnetic compensate torque generated by the measurement system. The micro-thrust automatic measurement system is a closed-loop automatic measurement system in which the rotation angle of the equipment can be measured by the angle displacement sensor and the electromagnetic damping single comes from the angular rate sensor. The singles from the sensors are sent to the torquer. Ultimately, the electromagnetic compensate force produces. This method has been applied in the thrust measurement field of the stationary plasma thruster. Thereinto, to the thruster which ultimate weight is 2kg, the expanded measurement uncertainty is 0.005 mNk=2when the measurement range is from 0.05 to 5 mN.