

## SPACE PROPULSION SYMPOSIUM (C4)

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THE EFFECT OF MAGNETIC FIELD ON THE PERFORMANCE OF THE ION THRUSTER  
DISCHARGE CHAMBER**Abstract**

This paper investigates the theoretical and experimental analysis of the effect of the magnetic field on the performance of the ion thruster discharge chamber. It analyzes the cases for the different sizes ion thruster. The results show that for a ion thruster discharge chamber, compared to the three magnetic configuration, the four magnets discharge chamber would increase the magnetic density of the upstream and cone of the anode, improve the beam flatness. The area of generation plasma would also increased, the magnetic field would confine the motion of the charged particles better. However, the more the number of the magnet, the bigger of the area that absorbed the electrons, the higher the loss rate of electrons, the lower the performance of discharge chamber. In addition, the increased the number of the magnet would also increase the weight of the thruster. Strengthening the middle of the magnetic density would not only improve the magnetic density, the propellant utilization, the beam flatness but also reduce the cost that generated a plasma and decrease the generational area. The uniformity of plasma is closely related to the magnetic field in the discharge chamber.