



Iranian Journal of Physics Research, Vol. 25, No. 2, 2025  
DOI: 10.47176/ijpr.25.2.22018

## The effect of crossing magnetic and electric fields on the flux of particles with different materials and dimensions of injected particles in the space plasma sheath

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(Received 3 December 2024; in final form 4 March 2025)

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### Abstract

This article investigates various methods for enabling the transmission of radio waves at frequencies lower than the plasma frequency. These methods include the injection of solid dielectric materials into the plasma and the use of a magnetic window to reduce plasma density for radio communication. The material and dimensions of injected particles in altering the transmission rate of radio signals have also been investigated. These methods can help reduce radio blackout during hypersonic flights and when spacecraft re-entering the Earth's atmosphere. However, there is a need for precise adjustment of electrodes and magnets to prevent increasing the weight of spacecraft and to configure magnetic field lines for the response of electrons to electromagnetic waves.

**Keywords:** Hypersonic spacecraft, Dusty plasma, Crossing electric and magnetic fields, Injected dielectric particle material, Transmission and reflection coefficients

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For full article, refer to the Persian section