

Abstract Submitted
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Communication through a plasma sheet around a fast moving vehicle¹ V.I. SOTNIKOV, S. MUDALIAR, Air Force Research Laboratory, Hanscom AFB, MA 01731, T. GENONI, D. ROSE, Voss Scientific, Albuquerque, NM 87108, USA, B.V. OLIVER, Sandia National Laboratories, Albuquerque, NM 87185, T.A. MEHLHORN, Naval Research Laboratory, Washington, DC 20375 — Investigation of the complicated problem of scattering of electromagnetic waves on turbulent pulsations induced by a sheared flow inside a plasma sheath is important for many applications including communication with hypersonic and re-entry vehicles. Theoretical and computational work aimed at improving the understanding of electromagnetic wave scattering processes in such turbulent plasmas is presented. We analyze excitation of low frequency ion-acoustic type oscillations in a compressible plasma flow with flow velocity shear and influence of such turbulent pulsations on scattering of high frequency electromagnetic waves used for communication purposes. We have appropriately included in our analysis the presence of electron and ion collisions with neutrals as well as electron - ion collisions. Results of numerical solutions for plasma density and electric field perturbations for different velocity profiles have been used in the derived expressions for scattered wave energy and scattering cross section.

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