

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Shear flow instability in a partially ionized plasma sheath around a fast moving vehicle¹ V. SOTNIKOV, S. MUDALIAR, Sensors Directorate, Air Force Research Laboratory, Hanscom AFB, T. GENONI, Voss Scientific, BRYAN OLIVER, Advanced Radiographic Technologies Department, Sandia National Laboratories, TOM MEHLHORN, Plasma Physics Division, Naval Research Laboratory — A shear flow instability in a partially ionized compressible plasma sheath around a fast moving vehicle is described and analyzed for different types of flow profiles. In compressible plasma flow with velocity shear instability occurs for any velocity profile, not only for profiles with an inflection point. Second order differential equation for the electrostatic potential of the ion acoustic waves thus excited is derived and solved numerically using the shooting code with the imposed outgoing wave boundary conditions. In contrast to our earlier study we have appropriately included in our analysis the presence of electron and ion collisions with neutrals as well as electron - ion collisions. It is shown that the density of the neutrals has an important influence on the growth and decay of the instability.

¹This work was supported by the Air Force Research Laboratory and Air Force Office of Scientific Research.

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Date submitted: 31 Aug 2010

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