Shear flow instability in a partially ionized plasma sheath around a fast moving vehicle

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— 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.

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