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Efficiency of plasma density control with dc discharge and magnetic field for different surface types in low pressure hypersonic flow IRINA SCHWEIGERT, Institute of Theoretical and Applied Mechanics — Recently the problem of communication blackout during reentrant flight still remains unsolved. The spacecrafts enter the upper atmospheric layers with a hypersonic speed and the shock heated air around them becomes weakly ionized. The gas ionization behind the shock front is associative in nature and occurs through chemical reactions between fragments of molecules [1]. The formation of a plasma layer near the surfaces of spacecraft causes serious problems related to the blocking of communication channels with the Earth and other spacecrafts. A promising way of restoring the radio communications is the application of electrical and magnetic fields for controlling the plasma layer parameters [2]. Nevertheless the flux of electrons and ions on the surface charges it that essentially decrease the effect of electro-magnetic control of local plasma density. In Ref.[3] it is shown that there is the way to remove the surface charge using the lateral diode string structures. Based on two dimensional kinetic Particle in cell Monte Carlo collision simulations, we study the possibility of local control the plasma layer parameters near a flat surface of two different types. The gas velocity distribution is set with a model profile. We apply DC voltage up to 4 kV and magnetic field B up to 200 G. 1. I.D. Boyd (2007). *Phys. Fluids* 19, 096102_1. 2. M. Keidar, M. Kim, I. D. Boyd (2008). *J. Spacecr. Rockets* 45, 445. 3. **A. Starikovskiy, R. Miles,** AIAA Meeting (Dallas, USA, January 2013) paper N2013-0754

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