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Plasmadynamic, electrogasdynamic and magnetohydrodynamic control of the body supersonic streamline TATIANA LAPUSHKINA, ALEXANDER EROFEEV, SERGEY PONYAEV, Ioffe Physical Technical Institute of the Russian Academy of Sciences — This work is concerned with possibility to control the shock-wave configuration by non-mechanical methods. The three types of action on structure of supersonic flow around semicylindrical body were considered: a plasmadynamic method coming from features of supersonic flows of highly nonequlibrium plasmas, electrogasdynamic (EGD) realized due to heating of a gas in gas discharges of high intensity, and magnetohydrodynamic (MHD) by action of Lorentz force appeared at organized in gas discharge electric current at transversal magnetic field. In the plasmadynamic control method a discharge creates a strongly nonequilibrium plasma in the flow before the body. In the EGD and MHD methods, a discharge was organized in the near surface area of the nose part of the body. Change of bow shock-wave position is investigated at: a) change of nonequliubrium degree T_e/T_h of incoming flow; b) increase of heating parameter$N = \frac{j\vec{E}\Delta t}{\rho u^2}$; c) increase of Steward parameter$St = \frac{jBL}{\rho u^2}$. Where $j$is current density, Å is electric field intensity, Δt is interaction time, Å is magnetic field induction, L is width of interaction zone, ρ and u are density and velocity of incoming flow. Experiments were conducted at the setup based on a shock tube. Xenon and air were used as a working gas.

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