THE INFLUENCE OF PLASMA ACTUATORS MATERIAL AND GEOMETRY ON THE ELECTROMAGNETIC CHARACTERISTICS OF THE DISCHARGE AND THE SPECIFIC THRUST OF SYNTHETIC JETS

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There has been a number of studies on the properties of wall jets produced by the dielectric barrier discharge of plasma actuators. There were many variations of electrodynamic [1] and geometric parameters of actuators [2, 3].

There was the question: how material of the electrodes influence on the process [4]? Formating of the synthetc jet begins from releasing of electrons from the exposed electrode. That’s why ionisation energy of material of electrode strongly influences on the ionization degree of the ambient air. Material with lesser ionisation energy emitting more electrons per sec. It leeds to rising of the force that acts on the stream. Thereby the output of synthetic jet is rising. The role of the specific resistance is ambiguous. Its increasing to a certain value contributes to rising of specific thrust at its extreme value relative to the distance between exposed electrodes. With further increasing it was shown inverse effect which was especially noticeable when we used electrodes of non-linear shape.

In this paper, we examine the effect of the electrode material on the value of specific thrust of the synthetic jet produced by symmetric actuator. The dependences of specific thrust on the distance between external electrodes for copper, aluminum, nickel, and titanium was made. A considerable effect of the shape of the external electrodes on the electric field and current density in the tape drive, and the specific thrust of the synthetic jet was investigated. It was also evaluated the role of autoelectronic emission on the current in streamers and the value of volume force acting on the stream.