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Optimizations of the RailPAc Plasma Actuator for Atmospheric Aerodynamic Flow Control MILES GRAY, YOUNG-JOON CHOI, LAXMINARAYAN RAJA, JAYANT SIROHI, University of Texas at Austin — Dielectric barrier discharge (DBD) actuators, a type of electrohydrodynamic (EHD) plasma actuator, have generated considerable interest in recent years. However, theoretical performance limitations hinder their application for high speed flows.[1] Magnetohydrodynamic (MHD) plasma actuators with higher control authority circumvent these limitations, offering an excellent alternative. The rail plasma actuator (RailPAc) is an MHD actuator which uses Lorentz force to impart momentum to the surrounding air.[2] RailPAc functions by generating a fast propagating arc column between two rail electrodes that accelerate the arc through $J \times B$ forces in a self-induced B-field. The arc column drags the surrounding air to induce aerodynamic flow motion. Our current work on the RailPAc focuses on a novel arc ignition method allowing for repeatable RailPAc firing necessary for any real world application as well as the effects of temperature, rail material, size, and external magnetic fields on induced velocities.

[1]D. F. Opaits et al., **J. Appl. Phys.** 104, 043304
[2]B. Pafford et al., **J. Appl. Phys. D.** 46, 485208

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