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Gasdynamic Diode: How to Stop 100-kV Streamer ANDREY STARIKOVSKIY, Princeton University, NICKOLAY ALEKSANDROV, Moscow Institute of Physics and Technology — The results of a two-dimensional numerical simulation of a streamer discharge developing through a shock wave in air were presented for various neutral density discontinuities across the wave. The focus was on the case when the streamer propagated from a low-density region to a high-density region. Streamer characteristics changed greatly after intersecting the shock wave. It was shown that the streamer failed to penetrate into the high-density region when the ratio between the densities in these regions was sufficiently high (>1.2). In this case, the discharge developed along the surface between these regions after reaching the boundary between them. Thus, the gaseous medium demonstrates a unidirectional conductivity on a short time scale; a gas density discontinuity forms a kind of "gas-dynamic diode" that allows the plasma channel to propagate in one direction and blocks its development in another. Streamers could penetrate into any of the high-density and low-density regions when a neutral particle density discontinuity was replaced by a gradual density change.

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