

Abstract Submitted
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Observation of Plasma Propagation in an Array of Microchannels

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University of Illinois at Urbana-Champaign — Discharge dynamics in an array of
microscale channels fabricated in Al/Al₂O₃ has been investigated at atmospheric
pressure in He and Ar. Microplasmas in channels having a width of 200-300 μm , a
length up to 50 mm, and a volume of 1-15 mm³ have been generated on a static or
flowing gas basis. Fabricated by micromachining and wet chemical processes, these
channels are situated in a dielectric barrier structure fabricated in 125-250 μm thick
Al foil and having a buried electrode geometry. Spatiotemporally-resolved optical
emission profiles, recorded with a gated CCD camera and a telescope, reveal a plasma
propagation speed (and direction of excited emission along the microchannel) which
varies with gas inlet pressure. For 1 atm of Ar, the velocity of the excitation wave
is ~ 15 km/s.

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