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Tubular jet generation by means of a pressure pulse induced by an eddy-current actuator ALEXANDER KLEIN, Robert Bosch GmbH, IVO R. PETERS, GERBEN MORSINK, CHAO SUN, DEVARAJ VAN DER MEER, University of Twente, ROBERT GIEZENDANNER-THOBEN, Robert Bosch GmbH, DETLEF LOHSE, University of Twente — The generation and the evolution of tubular jets is studied experimentally and compared to numerical results from a boundary integral code. The jets are created at the free surface above a liquid column of purified water. An eddy-current actuator driven by a high voltage capacitor bank is used to create a pressure pulse with a duration of about 100 μs and varying amplitude of up to 70 bar. The pressure pulse travels in the vertical water column of length 1 m before hitting the free surface in a capillary tube of $4 - 8$ mm in diameter. The process of jet formation is captured using high-speed imaging at up to 60 kHz, while the pressure pulse is recorded by two PVDF transducers at 20 MHz. The recordings and the numerical simulations enable us to study the effect of the control parameters on the jet velocity (which can reach up to 50 m/s) and the mass flow. Namely, we study the effect of the applied acoustic power of the pressure pulse and the initial curvature of the free surface.

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