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**Time-resolved Characterization of Plasma Jets Formed using a Piezoelectric Transformer** JINYU YANG, SEONG-KYUN IM, Department of Aerospace and Mechanical Engineering, University of Notre Dame, DAVID GO, Department of Aerospace and Mechanical Engineering, Department of Chemical and Biomolecular Engineering , University of Notre Dame — The time-resolved characteristics of plasma generated by a piezoelectric transformer (PT) have been investigated. A PT is a non-centrosymmetric crystal that converts low-voltage AC input to high-voltage AC output through an electro-mechanically coupled process. The high voltage gain can be several orders of magnitude, such that an atmospheric-pressure plasma jet (APPJ) can be formed off the surface of the PT. PTs are attractive for APPJ generation because of their simple operation and low power consumption. In this work, the temporal evolution of the PT-driven APPJ was visualized using an intensified CCD camera. For time-resolved plasma visualization, one period of the input voltage (˜14.8 s) has been separated into 60 phases with a time interval of 250 ns, and images are taken for each phase. Results visually demonstrate the APPJ formation within one period. Notably, the plasma formation is a discrete process, appearing at a fixed phase of the sinusoidal input, and the strongest plasma jet appears at the end of the positive cycle. Simultaneous measurements of the current, however, show that the discharge current spikes appear statistically about a half microsecond earlier than the strongest plasma jet images, which indicates that the plasma produces a strong afterglow.

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