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Inverted-vibrating cantilever in a uniform flow VEERA SAJJANAPU[1], THOMAS WARD[2], Iowa State University — We present an experimental study of the interaction between flexible structures and a flowing fluid medium using a soap film. The vertically falling soap film is capable of attaining speeds ranging from 1.5 - 3 m/s with an operating test section width of 8 cm yielding us a Reynolds number $Re > 5000$. Experiments were conducted for flexible cantilever beams of lengths L $\leq$ 10 mm and of thicknesses ranging from 0.03 - 0.08 mm that were placed at angles of attack ranging from 0° - 180°. We visualize the beam displacements, vibrations and wake with a high-speed camera. Assuming small vibrational amplitudes, we consider the Euler-Bernoulli beam theory to understand aspects of the dynamics. Data will be presented for Strouhal number versus inclination angles for the full range of angles. We observe a flutter behavior which seems to be dependent on the cantilever rigidity modulus.

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