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Vortex dynamics from a vibrating leaf upon drop impact[1] ZIXUAN WU, SEUNGHO KIM, SUNGHWAN JUNG, Cornell University — Raindrop impact have been shown to discharge rust spores and induce dispersal from leave surface through fluid-elasticity interactions and vortex ring formations. In contrary to impacts on rigid surface, here we present an exposition on the vortex dynamics transformations resulting from drop-induced leave oscillations. Experimentally, we utilized high-speed imaging to probe the complex vortex dynamics and S(Single)-P(Pair) shedding schemes from a damped harmonic oscillator (drop impacted a flexible, free-end beam) without a prescribed background flow. While low impact inertia is shown to yield single vortex shedding behavior, epitomized by the von Karman street, beam fluctuations from high inertia and even longitudinal twisting motions can give ways to paired vortex schemes and atypical vorticity generations. By tuning such interactions between drop inertia and beam elasticity, the beam vibrations show different frequency and amplitude regimes, with damping effect from lingering vortices and residual drop oscillations. Vorticity behavior of the induced airflow can then provide potential insights on more spore dispersal from simple mechanically induced vibrations.

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