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Water Interface Unsteadiness and Vortex Shedding in Wind-Driven Droplet Wakes[1] ROGER SIMON, EDWARD WHITE, Texas A&M University — Water drops adhere to solid substrates but can depin when wind forcing exceeds the surface adhesion tension force. We hypothesize that, at high Reynolds numbers, depinning is assisted by coupling between air vortex shedding in the separated wake and the natural frequency of the air-water interface. Simon and White (2018.DFD.G11.4) measured significant vortex shedding for drop protuberances at different downstream locations. This work seeks to better understand the near-field airflow conditions and dynamic motion of a water drop just before depinning. Simultaneous measurements of the unsteady interface shape and airflow fluctuations are used to determine whether the unsteady vortex shedding in a drop wake and interface oscillations are coupled. Depinning limits across a wide range of drop volumes are analyzed in conjunction with the unsteady interface and airflow measurements.

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