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Transition from Vortex Shedding to Turbulence[1] STANLEY STEERS, WALTER GOLDBURG, University of Pittsburgh — Two-Dimensional turbulence can be produced in soap films by inserting a one-dimensional grid (a comb); a single rod produces a von Karman vortex street. But what of the transition between these two flow phenomena? An investigation is made using two interacting vortex streets in a soap film driven by gravity. Since the size of the shed vortices is dependent upon the diameter of the generating object, for two rods a fixed distance apart, increasing their diameter increases the size of the vortices and thereby increases the interaction of the two streets. Two cones 1 cm apart are penetrated to various depths in the film to allow for the selection of different diameters, typically in the 2 to 5 cm range for flow speeds on the order of 1 m/s. Using a laser Doppler velocimeter, time series are taken of the vortex street velocity components both parallel and perpendicular to the mean flow at various points on an axis transverse to the mean flow. Power spectra of these velocity records contain notable features. Although the spectra still contain peaks at the shedding frequency of the vortex street, power law scaling is observed over a limited range.

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