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Vortex Street behind an Oscillating Wire on a Soap Film AARON MEYER, ILDOO KIM, X.L. WU, University of Pittsburgh — A von Kärmän vortex street, a periodic array of vortices behind a bluff body is normally characterized by a single frequency f_0 at which the vortices shed. In this study, von Kärmän vortex streets are generated on a 2D soap film using a glass-covered metal wire in a static magnetic field. When the wire is driven with electric current to make an oscillatory motion with frequency f_e, transverse to the mean flow, vortices shed at a frequency f' differs from f_0. It is seen that with oscillation, f_0 is suppressed, f'/f_e becomes a rational number, and vortices are rearranged to form an exotic spatial structure. This "frequency- locking" phenomena show some features of the sine-circle map, but the relevancy to the physical system is not clear. When the amplitude of the oscillation is large enough, the system becomes chaotic. In this chaotic regime, the energy power spectrum resembles that of 2D decaying turbulence.

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