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Secondary bifurcations of under water sand-ripples under oscillatory flow in narrow channels. TOMAS BOHR, Dept. of Physics and Center for Fluid Dynamics, The Technical University of Denmark, DK-2800 Kgs. Lyngby, Denmark, TEIS SCHNIPPER, Dept. of Physics and Center for Fluid Dynamics, The Technical University of Denmark, KEITH MERTENS, Dept. of Mathematics, Colorado State University, CLIVE ELLEGAARD, The Niels Bohr Institute, Denmark — Sand-ripples under oscillatory water flow form periodic patterns with wave lengths primarily controlled by the amplitude d of the water motion. When d is suddenly varied the sand-ripples undergo characteristic secondary bifurcations, which we study experimentally and compare to our proposed amplitude equation (previous lecture). In particular we focus on the so-called doubling transition where, initially, a new ripple is formed in each trough, and show that this transition is well reproduced theoretically for sufficiently large δ (asymmetry between trough and crest). We finally present experimental results showing that long range coupling is seen to a surprising degree in the initial details of the doubling transition: initially *two* new ripples form in every trough, but quickly either the left or the right one wins. And this choice is made collectively for the whole system.

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