

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Pattern formation in poroelastic systems CHRISTOPHER MACMINN, JOHN WETTLAUFER, ERIC DUFRESNE, Yale University — Poroelastic effects, where fluid flow through a porous solid is coupled to elastic deformation of the solid, play an important role in many natural and engineering systems. Due to the highly nonlinear nature of the fluid-solid coupling in these systems, instability-driven pattern formation is both likely and very poorly understood. Here, we use laboratory experiments to explore pattern formation in a model poroelastic system. We study the paradigmatic problem of fluid injection into a quasi-two-dimensional porous medium, and we show that poroelasticity results in a nonlocal coupling between the fluid and the solid that drives pattern formation in even relatively simple fluid flows.

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Date submitted: 03 Aug 2012

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