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Spatially localized states in natural doubly diffusive convection
ALAIN BERGEON, IMFT-UMR-UPS-CNRS 5502, EDGAR KNOBLOCH, University of California at Berkeley — Numerical continuation is used to compute a large multiplicity of stable spatially localized steady states in doubly diffusive convection in a vertical slot driven by imposed horizontal temperature and concentration gradients. The calculations focus on the so-called opposing case, in which the imposed horizontal thermal and solutal gradients are in balance. No-slip boundary conditions are used at the sides; periodic boundary conditions with large spatial period are used in the vertical direction. The results demonstrate the presence of homoclinic snaking in this system, and can be interpreted in terms of a pinning region in parameter space. The dynamics outside of this region are studied using direct numerical simulation. The behavior of the system resembles that recently identified in the cubic-quintic Swift-Hohenberg equation [1].

[1] J. Burke and E. Knobloch, Phys. Lett. A 360, 681–688 (2007).

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