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Oscillatory vortex dynamics in weak-pinning channels with periodic constrictions[1] K. YU, B.L.T. PLOURDE, Syracuse University, M.B.S. HESSELBERTH, P.H. KES, Leiden University — The dynamics of vortex flow in confined geometries can be explored with weak-pinning channels of superconducting a-NbGe surrounded by strong-pinning NbN channel edges. Periodic constrictions of the channel walls lead to strong oscillations of the critical current, which we observe through transport measurements of the vortex dynamics. We explore the role of the shape and periodicity of the confining potential, as well as intervortex interactions, by fabricating a variety of samples that me measure over a range of temperatures. For small magnetic fields, the measured critical currents are completely reversible with magnetic field, indicating that all of the vortices are confined to the weak-pinning channels. Beyond a certain threshold field, typically after at least several periods of the critical current oscillations, the critical current begins to exhibit magnetic hysteresis, characteristic of vortex entry into the strong-pinning NbN banks.

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