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Rapidly Expanding BEC Ring: Analog Cosmology in a Lab TED JACOBSON, University of Maryland, College Park, STEPHEN ECKEL, AVINASH KUMAR, IAN SPIELMAN, GRETCHEN CAMPBELL, Joint Quantum Institute — I will describe an experiment and some theory of an expanding, ring-shaped Bose-Einstein condensate. The expansion redshifts and damps long wavelength excitations, as in an expanding universe. After expansion, energy in the radial mode leads to the production of bulk topological excitations—solitons and vortices—driving the production of a large number of azimuthal phonons and, at late times, causing stochastic persistent currents. These complex nonlinear dynamics, fueled by the energy stored coherently in one mode, are reminiscent of a type of "preheating" that may have taken place at the end of inflation. (Based on 10.1103/PhysRevX.8.021021.)

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