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Quench-produced solitons in a box-trapped Bose-Einstein condensate ELI HALPERIN, JOHN BOHN, JILA, National Institute of Standards and Technology, and the University of Colorado, Department of Physics, Boulder, Colorado 80309, USA — We describe a protocol to prepare solitons in a quasi-1d box-trapped Bose-Einstein condensate using only a quench of the isotropic s-wave scattering length. A quench to exactly four times the initial scattering length creates one soliton at each boundary of the box, which then propagate in a uniform background density. No additional excitations are created during the quench. We investigate the robustness of this procedure to the scattering length ramp rate and an mismatch of the final scattering length. We additionally investigate the 3d regime, where the quench may cause excitations along the transverse directions of the elongated box, and give a procedure for minimizing these excitations even far away from the quasi-1d regime via an additional quench of the transverse confining potential.

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