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Probing the Collective Modes of Spherical Shell-Shaped Condensates with Quench Numerics[1] FRANCES YANG, Smith College, KUEI SUN, The University of Texas at Dallas, KARMELA PADAVIC, SMITHA VISHVESHWARA, University of Illinois at Urbana-Champaign, COURTNEY LANNERT, Smith College and the University of Massachusetts at Amherst — We explore the collective modes of Bose-Einstein condensates by numerical solution of the Gross-Pitaevskii equation with an external "bubble trap" potential ($V_{trap} = \sqrt{(r^2-\Delta)^2/4-\Omega^2}$) that can be continuously tuned between a thin spherical shell-shaped condensate (at large Δ) and an ordinary spherical condensate in a harmonic trap (at $\Delta = \Omega = 0$). We excite the condensate's collective modes by making a small sudden change to the trapping potential and analyzing the subsequent time evolution of the condensate wavefunction. We observe the evolution of the frequency of the low-lying collective modes between the limits of a thin-shell condensate and a filled-spherical condensate.

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