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Collective modes of a spherical shell condensate COURTNEY LANNERT, Wellesley College, Wellesley, Massachusetts 02481, TZU-CHIEH WEI, SMITHA VISHVESHWARA, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801 — Dilute ultracold bosonic atoms in three-dimensional optical lattices with a harmonic confining potential are expected to exhibit inhomogeneous phases – in particular phases containing superfluid regions confined to a spherical shell. It may also be possible to confine superfluids in this geometry using a special trap designed for this purpose. We explore the low-energy collective modes of a superfluid confined to a thin spherical shell analytically. In particular, in the limit of strong interactions we find two breathing modes with frequencies distinct from the spherical condensate breathing mode.

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