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Modeling the Expansion and Collapse of Shell-Shaped Bose-Einstein Condensates[1] LYDIA SHANNON, Physics Department, Smith College, Northampton MA, COURTNEY LANNERT, Smith College and University of Massachusetts Amherst — Bose-Einstein condensates, produced when atomic gases are cooled to near absolute zero, offer a macroscopic way to view the quantum mechanical world. In order to measure properties of these condensates, the cooled gas must be released from a potential trap and allowed to expand. We explore the three-dimensional system of a shell shaped BEC by applying a recent numerical method for solving the Gross-Pitaevskii equation, to study the properties of the condensate's expansion and collapse. Upon release of the BEC into a harmonic trap (inner collapse only), we observe self-interference fringes and central mass accumulation within the system, taking into account the interactions of atoms in the condensate. By manipulating the parameters of the trap, we also study spherically symmetric collective modes with properties that are distinct from that of a filled, spherical condensate.

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