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Design of a microgravity shell-geometry Bose-Einstein condensate experiment[1] NATHAN LUNDBLAD, THOMAS JARVIS, TIAGO CORREIA, Bates College — Notions of geometry, topology, and dimensionality have directed the historical development of quantum-gas physics. Here we review a planned microgravity flight experiment (NASA CAL, launching 2017) which will explore a trapping geometry for quantum gases that is both theoretically tantalizing and difficult to attain terrestrially: a trap forming a spherical or ellipsoidal shell. This trap could confine a Bose-Einstein condensate to the surface of an experimentally-controlled topologically-connected bubble. In particular we will review plans for observing shell condensates aboard CAL, and summarize some of the key technical challenges involved. Particular calculations of trap inhomogeneity (resulting in possible incomplete shell coverage) are presented, along with potential mitigation schemes.

[1]NASA/JPL

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