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S-cones in thin shells under indentation ALICE NASTO, Massachusetts Institute of Technology, AMIN AJDARI, Northeastern University, ARNAUD LAZARUS, MIT, ASHKAN VAZIRI, Northeastern University, PEDRO REIS, MIT — We perform a hybrid experimental and numerical investigation of the localization of deformation in indented thin spherical elastic shells. Past the initial linear response, an inverted cap develops as a Pogorelov circular ridge. For further indentation, this ridge looses axis-symmetry and sharp points of localized curvature form. We refer to these localized objects as *s-cones* (for shell-cones), in contrast with their developable cousins in plates (d-cones). We quantify the effect of systematically varying the indenter's radius of curvature (from point to plate load) on the formation and evolution of s-cones. In our precision desktop-scale experiments we use rapid prototyped elastomeric shells and rigid indenters of various shape. The mechanical response is measured through load-displacement compression tests and the deformation process is further characterized through digital imaging. In parallel, the experimental results are contrasted against nonlinear Finite Element simulations. Merging these two complementary approaches allows us to gain further physical insight towards rationalizing this geometrically nonlinear process.

[X] Prefer Oral Session
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