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**Structural bistability in quasi-hard-discs under adaptive circular confinement** IAN WILLIAMS, University of Bristol, ERDAL C. OGUZ, Heinrich-Heine-Universitaet Duesseldorf, PAUL BARTLETT, University of Bristol, HARTMUT LOEWEN, Heinrich-Heine-Universitaet Duesseldorf, C. PATRICK ROYALL, University of Bristol — The behaviour of materials under spatial confinement is dramatically different from that in the bulk. The exact nature of behavioural modification in confined systems is strongly dependent on the boundary enclosing the system with soft walls inducing different phenomena than similar hard walls. Here we present a quasi-two-dimensional colloidal model system confined by an adaptive circular boundary defined using holographic optical tweezers. The adaptive boundary is deformable, enabling mechanical measurements of pressure and leading to the observation of a novel structural bistability between concentric particle layering and locally hexagonal configurations at high density. These findings are reproduced in analogous Monte Carlo simulations. Additionally, shearing the confined system drives the this bistability resulting in the observation of a novel oscillatory state characterised by periodically self-similar structural organisation. Under varying conditions, both shear melted and rigid-body-like flow behaviour is observed.

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