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Non-dissipative shapable sheet NAOMI OPPENHEIMER, THOMAS WITTEN, University of Chicago — A sheet of paper that has been crumpled and flattened retains some amount of shapability that a bare, uncrumpled, sheet does not have: when deformed by external forces, it retains the deformed shape after the forces are removed. Using a frustrated two dimensional lattice of springs, we show that such shapability can be attained in a non-dissipative system. Numerical investigations suggest an extensive number of bistable energy minima using several variants of this scheme. The numerical sheet can be bent into a nearly-closed cylinder that holds its shape. We verify that the deformed shape is locally stable and compare its bending modulus in the deformed state with that in the initial flat state. We investigate the threshold for non-elastic deformation using various kinds of forcing.

Naomi Oppenheimer
University of Chicago

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