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Intermediate states in the folding of a granular polymer-like chain in water. JEFFREY OLAFSEN, Baylor University, BENJAMIN BAMMES, Baylor College of Medicine — The dynamics of a chain of stainless steel monomers partially submerged in a thin layer of water that is vertically oscillated on a horizontal plate have been observed to be visually similar to that of polymer collapse in a poor solvent. In this experiment, the model 'polymer' is composed of 25 to 250 loosely connected spheres that allows the chain to bend but also limits the smallest circle into which the chain can be folded (a persistence length). The surface tension plays the role of the long-ranged potential that is minimized during the folding process and the surface excitations of the thin, shaken fluid layer play the role of the Brownian noise that drives the system stochastically. In real polymer systems, folding often occurs via a process where the system passes through many intermediate states before finding its native configuration within the energy landscape. The dynamics in this model experimental system exhibit the same behavior of passing through local minima in the energy landscape with different relaxation rates in the intermediate states. This system is advantageous for studying polymer folding in poor solvents in the absence of many of the electrical and chemical details in real polymers.

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