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Macroscale Boltzmann statistics: Recreating statistical mechanics with a mechanically derived temperature KYLE WELCH, ERIC CORWIN, University of Oregon — We use chaotic Faraday waves to create a macroscopic 2D pseudothermal environment in which we study surface tension mediated interactions between buoyant particles. The chaotic surface waves create an effective temperature that is proportional to the driving amplitude. We use Boltzmann statistics to measure interparticle potentials by tracking the distribution of particle separations. This allows us to study interparticle interactions without interfering with the dynamics of the system. We explore various systems of multiple interacting particles, focusing particularly on systems of particles linked together in a chain with stiff links, in analogy to polymers. We explore the response of these systems to changes in parameters such as effective temperature, particle size, shape and wetting properties, as well as linker spacing and total chain length. We report on the effective entropic spring-like behavior of such systems in the limit of large chain length.

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