Abstract Submitted
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Does mass play a role in partition functions even in low Reynolds number systems?[1] REBECCA W. PERRY, Harvard University, School of Engineering and Applied Sciences, NICA FRANKLIN, The Cambridge School of Weston, VINOTHAN N. MANOHARAN, Harvard University, School of Engineering and Applied Sciences and the Department of Physics — Classical statistical mechanics predicts that heavy components of a reconfigurable object will preferentially occupy positions at the edges of the object while lighter components will most often reside near the object's center of mass. This predicted influence of mass comes in through the rotational component of the partition function, which favors configurations with larger moments of inertia. It is tempting to apply these findings of statistical mechanics directly to colloidal systems, but is this appropriate when colloidal systems are immersed in liquid rather than surrounded by vaccuum? Does mass have a place in the partition function of colloidal clusters at low Reynolds numbers where we are accustomed to ignoring inertia? Here, we measure how silica microspheres distribute themselves when mixed with identically-sized polystyrene microspheres to form weakly-bound clusters of up to ten spheres. Using an array of microwells, we observe thousands of two-dimensional clusters to answer these fundamental questions.

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Rebecca W. Perry
Harvard University, School of Engineering and Applied Sciences

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