

Understanding and harnessing entropy in colloids

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I will discuss what we have learned about entropy from experiments on micrometer-scale colloidal particles, which can be seen under an optical microscope. From experiments on small colloidal systems (clusters of interacting spherical particles), we find that entropy has a complex relationship with order and symmetry, but one that can be understood within a simple framework — so long as we allow that entropy is a measure of the number of states that we as observers choose not to distinguish, rather than of those that are fundamentally indistinguishable. I will then show how a better understanding of entropy allows us to design new materials and nanomachines.