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Non-classical assembly pathways of anisotropic particles[1]
STEPHEN WHITELAM, Lawrence Berkeley National Laboratory — Advances in inorganic synthesis and synthetic biology have spawned an array of nanoparticles and bio-inspired components of diverse shapes and interaction geometries. Recent computational and experimental work indicates that such anisotropic particles exhibit a variety of "non-classical" growth pathways, forming ordered assemblies via intermediates that do not share the architecture of the bulk material. Here we apply self-consistent mean field theory to a prototypical model of interacting anisotropic particles. We find that the impetus for non-classical ordering is in some regimes of parameter space thermodynamic in origin, and in other regimes of parameter space driven chiefly by considerations of particle mobility. We also introduce a molecular model of bacterial S-layer crystallization in order to illustrate features of non-classical assembly inaccessible to mean field theory.

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