

Simple models of competitive interactions in soft-matter: re-entrant liquids and gels on heating

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Abstract:

I will discuss how unconventional phase diagrams can arise in extreme cases of colloids interacting with competing interactions. Specifically I will discuss the case of dipolar hard spheres, where self-assembly into chains compete with the phase separation process and the case of a patchy particle model that behaves similarly. Then I will discuss how this concept of competing interactions can be exploited to design a system that gels on heating. Finally I will suggest a possible experimental realisation based on DNA nano-constructs.

References:

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Silvia Biffi et al, Phase behavior and critical activated dynamics of limited-valence DNA nano stars, *Proceedings National Academy of Science*, 110 15633-15637 (2013).