

Abstract Submitted  
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**Specific interactions in complex mixtures: effects on the thermodynamic stability of multicomponent protein solutions** WILLIAM JACOBS, DAAN FRENKEL, University of Cambridge — Multicomponent protein solutions, such as the cytosol, comprise complex networks of specific interactions in a crowded environment of molecules with nonspecific interactions, with dissociation constants spanning many orders of magnitude. We investigate the phase behavior of a multicomponent lattice model with both specific and non-specific interactions. We use bit strings to encode the binding strength between interacting patches on particles at neighboring lattice sites. The boundary of the well-mixed dilute phase is calculated for a statistical ensemble of mixtures using semi-grand Monte Carlo simulations and multicanonical histogram reweighting techniques. We examine the sensitivity of this phase boundary to the distribution of component interactions and demonstrate that the phase behavior is extremely sensitive to the high-end tail of the distribution of interaction strengths.

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