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**Interplay of isotropic and directional interactions and its role in phase behavior** DEBRA AUDUS, National Institute of Standards and Technology, FRANCIS STARR, Wesleyan University, JACK DOUGLAS, National Institute of Standards and Technology — Patchy particles, which interact through non-isotropic interactions have been studied extensively both computationally and theoretically in part because they are minimal models of protein solutions. Although proteins are inherently complicated molecules with complex shapes and interactions, when in solution, they associate and phase separate like patchy particles. However, patchy particles considered computationally are often composed of hard spheres with short-ranged attractive spots decorating the surface. Such a parameterization ignores the isotropic attractive interactions, which can potentially play an important role in phase behavior. To gain insight into this problem, we investigate patchy particles with isotropic interactions that range from purely repulsive to weakly attractive and explore how the interplay between isotropic interactions and directional interactions due to the spots affects both the phase coexistence and association in these systems. We find that for our model that even when the strength of isotropic interactions is weaker than the strength of directional interactions, the isotropic interactions can still dominate.

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