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**A diversity of binary colloidal crystals using DNA-directed interactions** JOHN CROCKER, MARIE UNG, W. BEN ROGERS, RAYNALDO SCARLETT, TALID SINNO, University of Pennsylvania — DNA is the premier tool for directing the controlled self-assembly of nanoscopic and microscopic objects. The interactions between microspheres due to the hybridization of DNA strands grafted to their surface have been measured and can be modeled in detail, using well-known polymer physics and DNA thermodynamics. Knowledge of the potential, in turn, enables the exploration of the complex phase diagram and self-assembly kinetics in simulation. In experiment, at high densities of long grafted DNA strands, and temperatures where the binding is reversible, these system readily form colloidal crystals having a diverse range of symmetries. For interactions that favor alloying between two same-sized colloidal species, our experimental observations compare favorably to a simulation framework that predicts the equilibrium phase behavior, crystal growth kinetics and solid-solid transitions. We will discuss the crystallography of the novel alloy structures formed and address how particle size and heterogeneity affect nucleation and growth rates.

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