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**Directing the Self-Assembly of Colloidal Particles** NATALIE ARKUS, The Rockefeller University; Institute for Advanced Study, VINOTHAN MANOHARAN, MICHAEL BRENNER, Harvard University — A mechanism for directing the self-assembly of spherical colloidal particles into any desired structure is presented. The mechanism is derived from an exact understanding of what structures the particles can form in thermodynamic equilibrium. This method can, in principle, be used to create materials with a specified structural arrangement. We discuss potential applications towards deriving an exact relationship for how the microscopic structural arrangement of a material determines its macroscopic properties.

Natalie Arkus  
The Rockefeller University; Institute for Advanced Study

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