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Optical assembly of thermodynamically stable colloidal clusters mediated by depletion BHASKAR JYOTI KRISHNATREYA, STEFANO SACANNA, KAZEM EDMOND, DAVID PINE, DAVID G. GRIER, New York University — Colloidal particles with complementary shapes can self-organize into composite structures under the influence of entropic attractions mediated by depletion. What structures can form is governed by the colloidal components' shapes. The structures' stability can be tuned by adjusting the strength of the depletion attraction. Even when a particular colloidal cluster configuration is thermodynamically stable, achieving the stable structure typically involves substantial kinetic barriers. We overcome these kinetic barriers by assembling geometrically organized colloidal clusters using holographic optical tweezers in three dimensions. Once formed, the structures are stable and undergo three-dimensional shape fluctuations that can be measured with video microscopy.

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