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Directed self-assembly of small colloidal clusters¹

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We study the formation and structure of equilibrium colloidal clusters at small particle number ($N \sim 10$) using optical microscopy. Our experimental system consists of isolated groups of colloidal microspheres with short-ranged attractions. With non-specific depletion interactions, we observe that the number of configurations increases sharply with N . The most favorable states are those with the lowest symmetry. With specific DNA-mediated attractions, the number of states is reduced. Experiments and theoretical calculations suggest that it is possible to direct the assembly of specific structures through multiple competing DNA-mediated interactions.

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