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Towards Artificial Molecules: Metallo-dielectric Clusters DINA ARONZON, VINOOTHAN MANOHARAN, JONATHAN FAN, Harvard University, SEAS — Recent advances in the synthesis of metallic colloids have allowed for an explosion in research into their optical properties. It is now possible to synthesize solid metallic colloids, core-shell colloids that mix different metals, and core shell colloids of metallo-dielectrics. In this talk I propose a mechanism for further exploring the optical properties of such materials by producing clusters of metallo-dielectric colloids and studying the relationship between the structure and composition of a colloidal cluster and its optical response. To this end, we synthesized a number of solutions, each of clusters consisting of a different average number of colloids. By doing this, we hope to study the effects of different dielectrics and near neighbor interactions on the plasmonic resonances of the metallic shells in the colloid. In the future, we hope to produce and study high yield, pure samples, both in solution and as photonic crystals. All of these options provide new ways of producing specific optical resonances that can be used in sensors, spectroscopy, optical triggers, and many other applications.

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