228f Nanotextured Surfaces Sensing and Manipulation of Colloidal Scale Objects

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By tuning the sizes, surface densities, and chemistries of 10-nanometer scale features on nano-patterned planar surfaces that interact with colloidal objects, we are able to control the adhesion of the latter and distinguish colloidal objects based on their surface features. This program, motivated by the need to develop artificial pattern recognition constructs for sensor applications, has developed systems displaying tunable dynamic behavior distinct from the performance of DNA- and antibody- chips. In DNA- and antibody- based sensors, once a target is recognized, adhesive surfaces not, generally, renewable. The colloidal-recognition sensing concept distinguishes the adhesion of the colloidal objects by their adhesion rates. In a substantial portion of the design space, the adhesion is reversible and surface features can give rise to particle rolling, a finding which is upheld by a new model incorporating hydrodynamic forces with a spatially varying colloidal-scale field. This talk highlights these new sensing surface features and provides a fundamental explanation for this performance.