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Different modulation mechanisms of attractive colloidal interaction by lipid and protein functionalization YUPENG KONG, RAGHUVEER PARTHASARATHY, Department of Physics, University of Oregon — The nature of attractions observed between like-charged colloidal particles near a confining wall is still mysterious, due in part to the lack of experimental systems with tunable interparticle interactions. Biomembranes are appealing candidates for colloidal functionalization, enabling access to electrostatic and chemical properties that influence inter-particle relations. We have generated two classes of particles, derivatized with lipid-only and lipid-plus-protein membranes, each of which show attractive pair interactions whose magnitude can be tuned over a range of about $1k_BT$. However, the two particle types exhibit profoundly different correlations between the depth of the attractive potential well and the spatial range of the interaction as well as between well depth and distance to the confining wall. This indicates that separation from the wall is not the decisive determinant of like-charge attraction and, more importantly, that there may be more than one mechanism responsible for observed attractive phenomena.

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