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Biomembrane-mediated control of like-charge colloidal attraction

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KONG, RAGHUVVEER PARTHASARATHY, Department of Physics and Material Science Institute, The 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 inter-particle interactions. Biomembranes are appealing candidates for colloidal functionalization, enabling access to electrostatic and chemical properties that influence inter-particle relations. Previous optical-trap based examinations of lipid membrane functionalized particles revealed a surprising linear relationship between the magnitude of the attractive pair potential and the particle charge in presence of a wall of constant charge density. Here, using lipid membranes to also functionalize the confining wall, thereby controlling its charge density, we find a non-linear relationship between inter-particle attraction and charge. Our results highlight the role of substrate-induced fields in controlling pair interactions between colloidal microparticles.

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