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Calcium-induced domain formation in mixed lipid monolayers WOUTER G. ELLENBROEK, Department of Physics and Astronomy, University of Pennsylvania, DAVID A. CHRISTIAN, Chemical & Biomolecular Eng'g and the Laboratory for Research on the Structure of Matter, University of Pennsylvania, ILYA LEVENTAL, Institute for Medicine and Engineering, University of Pennsylvania, ANDREA J. LIU, Department of Physics and Astronomy, University of Pennsylvania, PAUL A. JANMEY, Departments of Physics and Astronomy, and Bioengineering, University of Pennsylvania — Multivalent ions such as calcium play an important role in soft matter and biological systems. This role cannot be captured by a mean field treatment of the electrostatics such as the Poisson-Boltzmann equation, which neglects, for example, the fact that Ca^{2+} -ions can mediate attractions between negatively-charged objects. We show, both experimentally and theoretically, that Ca^{2+} -mediated attractions lead to phase separation of charged and neutral lipid molecules in mixed lipid monolayers, and discuss the dependence on pH, salt concentration and ion valency.

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