Abstract Submitted
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Lipid structure, lateral order and intermembrane forces URI RAVIV, The Hebrew University of Jerusalem — Using solution x-ray scattering and advanced analysis tools, developed in our lab (J. Chem. Info. Modeling 56, 1518, 2016), we are investigating the high-resolution structure of charged and/or dipolar lipids under various aqueous solution conditions (Soft Matter, 7, 1512, 2011; Langmuir, 27, 7419, 2011;J. Phys. Chem. B, 115, 14501, 2011;Langmuir, 27, 14767, 2011;Langmuir, 28, 2604, 2012.;J. Phys. Chem. B, 116, 3519 , 2012;Soft Matter. 9, 10640, 2013;Langmuir, 30, 14725, 2014.;J. Phys. Chem. A, 120, 3390, 2016.). These conditions include, different salt solutions containing monovalent, multivalent, or polyvalent ions, as well as ionic liquids. We determine the electron density profile along the normal to the membrane plane and the spacing between bilayers when lamellar phases form. Using the osmotic stress method, we are determining the forces between these bilayers under different conditions and compare with the predicted interactions based on thermal fluctuations and a modified Poisson Boltzmann theory. This comparison reveals the extent of ion dissociation, entropic effects, membrane elastic properties, and the non electrostatic interactions between the ions and the lipid membranes. We are also revealing the lateral order within the bilayers, using solution wide angle x-ray scattering experiments and our advanced analysis tools.

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