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Attractions Between Like-Charged Walls Via Local Molecular Field Theory[1] JOCELYN M. RODGERS, CHARANBIR KAUR[2], YNG-GWEI CHEN[3], JOHN D. WEEKS, University of Maryland, College Park — A simple model used to explore the interaction between like-charged macroions as mediated by intervening counterions is treated with local molecular field theory (LMF). LMF has recently been extended to general Coulombic systems by splitting the Coulomb potential $1/r$ into a short-ranged core that can be explicitly simulated and a long-ranged portion treated using a mean field approach; the potential separation is determined by a physically-relevant spacing parameter σ. Here we show that LMF can treat the two-wall model system surprisingly well using an analytical Poisson-Boltzmann type technique. Also, combining self-consistent solution of LMF with simulation of the short-ranged core particles using the minimum image convention yields even more accurate results without using costly and complex Lekner or Ewald sums.

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[2]Now at University of Texas
[3]Now at NIH

Jocelyn Rodgers

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