Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Supersolid phases in two-dimensional dipolar Bose liquids CHRIS LAUMANN, DAVID HUSE, Princeton University, RODERICH MOESSNER, MPI PKS, Dresden, SHIVAJI SONDHI, Princeton University, BORIS SPIVAK, University of Washington — We consider a system of Bose molecules confined in a two-dimensional trapping potential with repulsive dipolar interactions. We show that in between the usual superfluid and crystalline phases there are necessarily other phases which may be viewed as mesoscale mixtures of the two. The particular stable microemulsions vary with microscopic details but they generically feature superfluidity in conjunction with the breaking of translational symmetry and thus are supersolids. We discuss the stability of these phases to thermal and quantum fluctuations and consider the particular mesoscale phases arising in the limit of a weak underlying first order transition.

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Date submitted: 20 Nov 2009 Electronic form version 1.4