Abstract Submitted
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Dipolar bosons in an array of one-dimensional tubes[1] JULIA S. MEYER, The Ohio State University, CORINNA KOLLATH, Centre de Physique Theorique, Ecole Polytechnique, THIERRY GIAMARCHI, University of Geneva, DPMC-MaNEP — Ultra-cold atomic and molecular gases offer a unique possibility to realize a range of novel interacting many-body systems. While in solid state systems electrons interact via the long-range Coulomb interactions, the interactions in cold gases are essentially local. However, the use of dipolar atoms or molecules allows one to surmount this limitation. We investigate bosonic atoms or molecules interacting via dipolar interactions in a planar array of one-dimensional tubes. In the situation where the dipoles are oriented perpendicular to the tubes by an external field, various quantum phases can be realized by varying the strength of the interactions and the orientation of the dipoles with respect to the plane of the array. We find a 'sliding Luttinger liquid' phase in which the tubes remain Luttinger liquids and two-dimensional charge density wave ordered phases with different kinds of order. In particular, a stripe phase in which the bosons in different tubes are aligned as well as a checkerboard phase occur.

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