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Magnetism of one-dimensional Wigner lattices and its impact on charge order MARIA DAGHOFER, Univ. of Tennessee, Knoxville, REINHARD NOACK, Philipps Universitaet Marburg, PETER HORSCH, MPI for Solid State Research, Stuttgart — We report the phase diagram of a quarter-filled Wigner lattice described by the 1D Hubbard-Wigner model with nearest and next-nearest neighbor hopping t_1 and t_2 . In the t_1 - t_2 plane, we find a region at negative t_2 with fully saturated ferromagnetic ground states due to kinetic exchange interactions, while the remaining phase diagram is controlled by antiferromagnetic exchange. We also observe a strong influence of magnetism on the charge structure factor, in contrast to the expectation that charge ordering in the Wigner lattice is well described by spinless fermions. Our results, obtained using the density-matrix renormalization group and exact diagonalization, can be transparently explained within the framework of an effective low-energy Hamiltonian.

Maria Daghofer
Univ. of Tennessee, Knoxville

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