

Abstract Submitted
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Supersolidity of dipolar Fermi gas in a simple cubic optical lattice

TIAN-SHENG ZENG, LAN YIN, Peking Univ — We study the phase diagram of a dipolar fermi gas at half-filling in a cubic optical lattice with dipole moments aligned along the z -axis. The anisotropic dipole-dipole interaction leads to the competition between p_z -wave superfluid and nematic charge-density-wave (CDW) orders in the system at low temperatures. We find that the superfluid phase is favored with weak interactions, while the CDW phase dominates with strong interactions. In between, the supersolid phase appears due to the competition between superfluid and CDW orders. The superfluid densities are anisotropic in the supersolid and superfluid phases. In the CDW phase, there is a semimetal to insulator transition with the increase of the interaction strength. The implication for experiments is discussed.

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