

Abstract Submitted
for the FWS19 Meeting of
The American Physical Society

The Dynamical Structure Factor of a Fermionic Supersolid on an Optical Lattice PATRICK KELLY, ETTORE VITALI, ANNETTE LOPEZ, California State University Fresno, GIANLUCA BERTAINA, DAVIDE GALLI, Università degli Studi di Milano — We perform a Quantum Monte Carlo study of a cold Fermi gas on a 2D optical lattice, realized with laser standing waves. The system is modeled with a Hubbard hamiltonian with on-site attractive interaction. At half-filling, when on average one fermion occupies each lattice site, the system displays an intriguing supersolid phase: a superfluid with a checkerboard density modulation. Interfacing unbiased Auxiliary-Field Monte Carlo simulations with state-of-art analytic continuation techniques, we compute the density dynamical structure factor $S(\mathbf{q}, \omega)$ of the system and the density response function $\chi(\mathbf{q})$, in order to characterize this supersolid phase. These results shed light into this interesting physical regime, where s -wave pairing superfluidity coexists with a non-uniform local density.

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Date submitted: 23 Sep 2019

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