FFLO phase on an optical lattice: a quantum Monte Carlo study\textsuperscript{1} CHIA-CHEN CHANG, SHIWEI ZHANG, Department of Physics, College of William and Mary — Recent experimental progress in cold Fermi gases has demonstrated the possibility of realizing exotic quantum phases in optical lattices. One example is the Fulde-Ferrel-Larkin-Ovchinnikov (FFLO) state arising from pairing across the Fermi surfaces in a spin-imbalanced system with attractive interaction. We study ground state magnetic properties in 2D and 3D repulsive Hubbard models at intermediate interaction strengths by means of a highly accurate auxiliary-field quantum Monte Carlo method \cite{Chang2008} coupled with Twist-averaged boundary conditions. The sign problem is controlled by a generalized constrained path approximation. It is found that the ground state shows incommensurate spin density wave order with periodic spatial modulation when the model is slightly doped away from $n = 1$. We present our results in 2D \cite{Chang2010} and 3D, and discuss their implications, through a particle-hole transformation, on the FFLO phase on an optical lattice of spin-imbalanced fermions with an attractive interaction. This work is supported by ARO. Reference: \cite{Chang2008}\cite{Chang2010}.

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