

Abstract Submitted  
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**Novel Pairing States in the p-orbital Honeycomb Optical Lattice**

WEI-CHENG LEE, University of California, San Diego, CONGJUN WU, SANKAR DAS SARMA, University of Maryland — We report on the novel pairing states of the spinless fermions in the two-dimensional honeycomb optical lattice with p orbitals. Because of the significant enhancement of the interaction effect due to the existence of two flat bands, the system could be in the pairing state even as it is away from the p-wave Feshbach resonances. We find that the gap symmetry is naturally to be f-wave and the Andreev bound state can be found under certain conditions. As the optical lattice is under rotation, although the f-wave gap symmetry is destroyed, the topological pairing states exhibiting gapless edge states could arise. The experimental setup to detect these novel pairing states will be discussed.

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