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Chiral spin density wave order on frustrated honeycomb and bilayer triangular lattice Hubbard model at half-filling KUN JIANG, YI ZHANG, Department of Physics, Boston College, Chestnut Hill, MA 02467, USA, SEN ZHOU, State Key Laboratory of Theoretical Physics, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing 100190, China, ZIQIANG WANG, Department of Physics, Boston College, Chestnut Hill, MA 02467, USA — We study the ground state properties of the Hubbard model on the honeycomb lattice with nearest-neighbor t_1 and second nearest-neighbor hopping t_2, which is isomorphic to the bilayer triangular lattice. We show that, at half-filling, chiral spin-density wave (χ-SDW) order emerges due to on-site Coulomb interaction U in a wide range of t_2/t_1 where both the two-sublattice antiferromagnetic order for small t_2/t_1 and the decoupled three-sublattice 120° magnetic order are strongly frustrated. For fixed t_2/t_1, we find that increasing U leads to a continuous transition from a χ-SDW semimetal with anomalous Hall effect to a topological chiral Chern insulator exhibiting quantum anomalous Hall effect, which undergoes a first order transition into a χ-SDW insulator with zero total Chern number but anomalous AC Hall effect. We obtain the rich phase diagram and discuss the novel magnetic and topological properties.

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