

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spontaneous quantum Hall effect in an atomic spinor Bose-Fermi mixture ZHI-FANG XU, University of Pittsburgh, XIAOPENG LI, Univ of Maryland-College Park, PETER ZOLLER, University of Innsbruck, W. VINCENT LIU, University of Pittsburgh — We study a mixture of spin-1 bosonic and spin-1/2 fermionic cold atoms, e.g., Rb-87 and Li-6, confined in a triangular optical lattice. With fermions at $3/4$ filling, Fermi surface nesting leads to spontaneous formation of various spin textures of bosons in the ground state, such as collinear, coplanar and even non-coplanar spin orders. The phase diagram is mapped out with varying boson tunneling and Bose-Fermi interactions. Most significantly, in one non-coplanar state the mixture is found to exhibit spontaneous quantum Hall effect in fermions and crystalline superfluidity in bosons, both driven by interaction.

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Date submitted: 08 Nov 2014

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