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Fractional Chern insulator on the triangular lattice STEFANOS KOURTIS, JÖRN VENDERBOS, JEROEN VAN DEN BRINK, MARIA DAGHOFER, Leibniz Institute for Solid-State and Materials Research — The opportunity for the formation of fractional quantum-Hall (FQH) states in 3-orbital Hubbard and Kondo lattice models on the triangular lattice without an external magnetic field has been recently demonstrated [1,2]. With this as motivation, an effective interacting spinless-fermion model, which is designed to capture the essential relevant physics, has been extensively studied. Its numerically obtained ground states at several fillings exhibit features which suggest that the former are spontaneously occurring FQH states on a lattice, i.e. fractional Chern insulator (FCI) states. The most unequivocal feature of such states is arguably their fractionally quantized Hall conductivity. This effect, as seen in numerical calculations for finite clusters, will be presented and discussed. Having thus identified FCI states, further signatures of their nature are highlighted, e.g. fractional quasihole statistics.

[1] J.W.F. Venderbos, S. Kourtis, J. van den Brink, and M. Daghofer, Phys. Rev. Lett. 108, 126405.

[2] S. Kourtis, J.W.F. Venderbos, and M. Daghofer, arXiv:1208.3481.

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