Abstract Submitted
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**Magnons in a honeycomb ferromagnet** SAIKAT BANERJEE, Nordita, Stockholm — The original discovery of the Dirac electron dispersion in graphene led naturally to the question of Dirac cone stability with respect to interactions, and the Coulomb interaction between electrons was shown to induce a logarithmic renormalization of the Dirac dispersion. With the rapid expansion of the list of Dirac fermion compounds, the concept of bosonic Dirac materials has emerged. At the single particle level, these materials closely resemble the fermionic counterparts. However, the changed particle statistics affects the stability of Dirac cones differently. Here we study the effect of interactions focusing on the honeycomb ferromagnet - where the quasi-particles are magnetic spin waves (magnons). We demonstrate that magnon-magnon interactions lead to a significant renormalization of the bare band structure. We also address the question of the edge and surface states for a finite system. We applied these results to ferromagnetic $CrBr_3$, where the $Cr^{3+}$ atoms are arranged in weakly coupled honeycomb layers. Our theory qualitatively accounts for the unexplained anomalies in neutron scattering data from 40 years ago for $CrBr_3$ and hereby expand the theory of ferromagnets beyond the standard Dyson theory.

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