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Theory of Magnetization of Interacting Bloch Electrons PRASANTA MISRA, University of Houston, GOURI TRIPATHI, Berhampur University, India — We derive a theory of magnetization of interacting Bloch electrons in the paramagnetic limits. We start with a thermodynamic potential, which includes both the quasi-particle and correlation contributions. The startling result obtained by us is that the modifications brought about by the electron-electron interactions for the magnetization in the quasi-particle interaction is precisely cancelled by the contributions due to electron correlations and thus the magnetization is devoid of explicit many-body corrections. In contrast, it is well known that both the spin susceptibility and the spin Knight-shift are exchange enhanced by electron-electron interactions. This is due to second order effects in the sense that while both the spin vertices are renormalized, the renormalization of only one of the vertices is cancelled by the contribution due to electron correlations. However, there is only one spin-vertex in the expression for magnetization which is renormalized in the quasi-particle approximation. We discuss the importance of self-energy corrections on the single-particle spectrum and we have shown as how to predict that the interacting electron system is magnetic or not by considering a variant of the Hubbard Hamiltonian in the momentum space.

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