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Collective Electronic Excitations in Ferromagnetic Metals

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Abstract content
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Collective electronic excitations in the system of interacting conduction electrons of ferromagnetic metals (Fe, Co, Ni) are investigated. These conduction electrons stem from relatively narrow d-type bands and a suitable model to describe them is the Hubbard model. Treating the Thomas-Fermi screening as a dynamic phenomenon yields oscillations in the electron density. These charge density waves (plasmons) are determined from the poles of the dielectric function epsilon;(q,E) that is approximately evaluated within the random phase approximation RPA. On the other hand, spin wave energies (magnons) are identical to the poles of the transverse susceptibility. Magnetizations m(T,n) , Curie temperatures T_C (n), and the temperature dependent exchange splitting Delta;E_{ex} are calculated within reasonable agreement with experimental results.

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