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Itinerant magnetism in metallic $CuFe_2Ge_2$[1] K. V. SHANAVAS, D. J. SINGH, Oak Ridge National Laboratory — Discovery of superconductivity in iron pnictides and chalcogenides has generated interest in the coexistence and interplay of superconductivity and magnetism. Antiferromagnetic spin fluctuations are believed to be mediating superconductivity in these systems. The large spin-fluctuations may arise as a consequence of nearness to a quantum critical point (QCP), which can also lead to non-Fermi liquid behavior, unusual transport and novel ground states. Thus, it is of interest to look for other materials that share similar characteristics. Using density functional theory based calculations we have studied the electronic structure and magnetic properties of $CuFe_2Ge_2$ based on it's structural similarities with recently discovered YFe_2Ge_2. We find large density of states at the Fermi level $[N(E_F)]$, consistent with itinerant character. Fermi surfaces in this system have a sheet like structure amenable to nesting and consequently to magnetic instabilities. Our results suggest that $CuFe_2Ge_2$ is an antiferromagnetic metal, with similarities to the Fe-based superconductors; such as magnetism with substantial itinerant character and coupling between magnetic order and electrons at the Fermi energy.

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