Quantum interference in disordered ferromagnet U_2NiSi_3

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U_2NiSi_3 is a ferromagnet with the Curie temperature $T_C = 26$ K and the ordered magnetic moment lying within the *ab* plane of the hexagonal unit cell. The overall temperature and magnetic field dependencies of the electrical resistivity clearly reveal an interplay of the ferromagnetic ordering and quantum interference effects (QIE) resulting from crystallographic disorder. Electron-electron interaction manifests itself as a $T^{0.5}$ increase in the in-plane and out-of-plane electrical resistivity $\rho(T)$ below 4 K. This effect is weakly dependent on external magnetic field (B_{ext}) that is much smaller than internal magnetic field (B_{int}) resulting from magnetic exchange interactions. In contrast, weak localization (WL) is observed solely in the *ab*-plane resistivity as a linear-in-T contribution to $\rho(T)$, clearly seen in weak B_{ext}. In the out-of-plane $\rho(T)$, WL is suppressed already by B_{int}, which gives rise to a maximum in $\rho(T)$ near T_C. It implies that B_{int} does not break the interference of closed trajectories of electrons moving in the *ab*-plane in opposite directions, similarly to 2D disordered ferromagnets with in-plane magnetic induction. All our findings point to an important role of exchange field and magnetic anisotropy on QIE in disordered ferromagnets.

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