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Spin wave dispersion of the antiferromagnet CuMnSb

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CuMnSb is a half Heusler alloy which orders type-II antiferromagnetically and is, thus, unique among the 3d transitional metal heusler alloys. Theoretical calculations suggested that type-II antiferromagnetism is not the energetically favored state and is only stabilized by structural defects. Further, a high quality CuMnSb single crystal exhibits a additional phase transition within the magnetic phase where the spins cant slightly away from the initial direction. Additionally, characteristics of different interactions have been observed, namely itinerant, local moment and spin orbit coupling. This shows that the magnetic ground state is a more complex nature than other typical type-II antiferromagnets. We studied CuMnSb with inelastic neutron scattering and measured among others the spin wave dispersion. By that, we were able to quantize the interaction between neighbouring spins and answer some questions of the magnetic interaction in CuMnSb.

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