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**Anomalous Hall effect in single-crystalline EuIn2P2**

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The hexagonal Zintl compound EuIn2P2 crystallizes with the space group *P*63/*mmc* and its chemical unit cell consists of alternating layers of Eu2+ and [In2P2]2-. It shows ferromagnetic (FM) order of Eu magnetic moments within the Eu atoms layers, with the moments direction slightly tilted out of the hexagonal plane in the opposite manner for every second Eu layer. This canted FM ordering occurs below *T*C = 24 K [1,2] but short-range magnetic correlations govern the electrical transport properties of EuIn2P2 up to as high temperature as 150 K [2]. Here, we show that the short-range order causes also a peculiar behavior of its Hall resistivity, represented by a sum of the ordinary, anomalous and topological terms, where the latter one arises due to the non-collinear magnetic structure of EuIn2P2. As displayed in Fig. 1, the anomalous contribution to the Hall effect in this material attains its maximum near *T*C (orange curve) determined by critical spin fluctuations, and then its untypical enhancement occurs between 40 and 150 K, where the short-range order is most pronounced.

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|  | Figure 1: The anomalous Hall resistivity of EuIn2P2 due to its non-collinear magnetic structure and short-range magnetic order. |

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**References**

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