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The Chiral Anomalous Hall Effect in re-entrant AuFe alloys. FREDERIK FABRIS, VIVIEN ZAPF, ALEX LACERDA, MPA-NHMFL, Los Alamos National Laboratory, MS E536, Los Alamos, New Mexico 87545, USA, PAULO PUREUR, JACOB SCHAF, VALDEMAR VIEIRA, Instituto de Fisica, Universidade Federal do Rio Grande do Sul, Caixa Postal 15051, 91501970, Porto Alegre, Brazil, IAN CAMPBELL, Laboratoire des Colloides, Verres et Nanomateriaux, Universite Montpellier II, France — The Hall Effect has been studied in a series of AuFe samples in the re-entrant concentration range, as well as in part of the spin glass range. The Hall coefficient has been measured in function of temperature and applied magnetic field. The present experimental data demonstrate that is indeed a negative contribution in addition to the canonical Karplus-Luttinger term. An anomalous Hall contribution linked to the tilting of the local spins can be identified, confirming theoretical predictions of a novel topological Hall term induced when chirality is present. This effect can be understood in terms of Aharonov-Bohm-like intrinsic current loops arising from successive scatterings by canted local spins. The experimental measurements indicate that the chiral signal persists, meaning scattering within the nanoscopic loops remains coherent, up to temperatures of the order of 150 K.

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