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Magnetoresistance measurements in a chiral magnet CrNb_3S_6 subject to locally applied magnetic field YU MATSUMOTO, Osaka Prefecture Univ., YUSUKE KOUSAKA, JUN AKIMITSU, Aoyama Gakuin Univ., SADAFUMI NISHIHARA, KATSUYA INOUE, Hiroshima Univ., ROBERT STAMPS, Univ. of Glasgow, ALEXANDER S. OVCHINIKOV, Ural Federal Univ., JUN-ICHIRO KISHINE, The Open Univ. of Japan, YOSHIHIKO TOGAWA, Osaka Prefecture Univ. — CrNb_3S_6 is one of interesting magnetic materials with structural chirality, wherein chiral magnetic orders are formed as a consequence of the competition between Heisenberg exchange and antisymmetric Dzyaloshinsky-Moriya (DM) interactions. Interestingly, a chiral helimagnetic order appears as the ground state at zero magnetic field, while it transforms into a chiral spin soliton lattice; a spin superlattice of forced ferromagnetic regions partitioned by a soliton with 2π rotation of spin magnetic moments, in the presence of magnetic field applied perpendicular to the chiral structural axis [1]. In this work, we have investigated the magnetoresistance (MR) in a micro-fabricated single crystal of CrNb_3S_6 by means of the standard ac transport measurement. We have found that the MR exhibits a hysteresis behavior during the magnetic field cycle, although a continuous negative MR is observed in a bulk single crystal [2]. In the presentation, we will show the MR changes induced by locally applied magnetic field and discuss their properties in terms of the macroscopic coherence of the chiral spin soliton lattice.

[1] Y. Togawa et al., Phys. Rev. Lett. 108, 107202 (2012).

[2] Y. Togawa et al., Phys. Rev. Lett. 111, 197204 (2013).

Yu Matsumoto
Osaka Prefecture Univ.

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