Spin-dynamics of a chiral antiferromagnet Mn_3Sn

東大物性研[1], 阪大 CSRN[2], CREST[3], 東北大 AIMR[4], 東北大 CSRN[5],
東大物工[6], 理研 CEMS[7], 東北大 CSIS[8], 東大理物[9]
○三輪真嗣[1,2,3], 飯浜賢志[4,5], 野本拓也[3,6], 冨田崇弘[1,3], 肥後友也[1,3], Ikhlas Muhammad[1],
大谷義近[1,3,7], 水上成美[4,5,8], 有田亮太郎[3,6,7], 中辻知[1,3,9]

ISSP, UTokyo[1], CSRN-Osaka[2], CREST[3], AIMR Tohoku Univ.[4], CSRN-Tohoku[5],
Dep. Appl. Phys. UTokyo[6], RIKEN[7], CSIS Tohoku Univ.[8], Dep. Phys. UTokyo[9]
○S. Miwa[1,2,3], S. Iihama[4,5], T. Nomoto[3,6], T. Tomita[1,3], T. Higo[1,3], M. Ikhlas[1],
Y. Otani[1,3,7], S. Mizukami[4,5,8], R. Arita[3,6,7] & S. Nakatsuji[1,3,9]
E-mail: miwa@issp.u-tokyo.ac.jp

Understanding of spin dynamics forms the basis of spintronic application. Recently, the metallic antiferromagnets Mn_3X have attracted significant attention for its strong response (e.g. anomalous Hall effect [1]) comparable to ferromagnets owing to the hidden ferroic order, which configures large Berry curvature originated from Weyl points in a momentum space. Such ferroic order can be characterized by cluster magnetic octupoles based on neighboring magnetic moments [2] (Fig. 1**a**), and thus it is highly important to clarify the dynamics of cluster octupole for designing spintronics devices. In this study, we have revealed the dynamics of a chiral antiferromagnet Mn_3Sn utilizing magneto-optical Kerr effect.

A single-crystal $D0_{19}$-Mn_3Sn in a bulk form has been employed for this study. Figure 1**b** shows static MOKE results. For polar MOKE (**B** // (2-1-10)), a large Kerr rotation angle with clear hysteresis was observed. While clear hysteresis curve was also confirmed in longitudinal MOKE in [01-10], a significant signal was not confirmed in [0001]. These are the typical characteristics of Mn_3Sn [3]. Results of time-resolved MOKE will be discussed in the presentation [4]. A part of this work was supported by JSPS-KAKENHI (Nos. 18H03880) and JST-CREST (JPMJCR18T3).

[1] S. Nakatsuji *et al.*, Nature **527**, 212 (2015). [2] M.-T. Suzuki *et al.*, Phys. Rev. B **95**, 094406 (2017).
[3] T. Higo *et al.*, Nat. Photon. **12**, 73 (2018). [4] S. Miwa *et al.*, submitted.

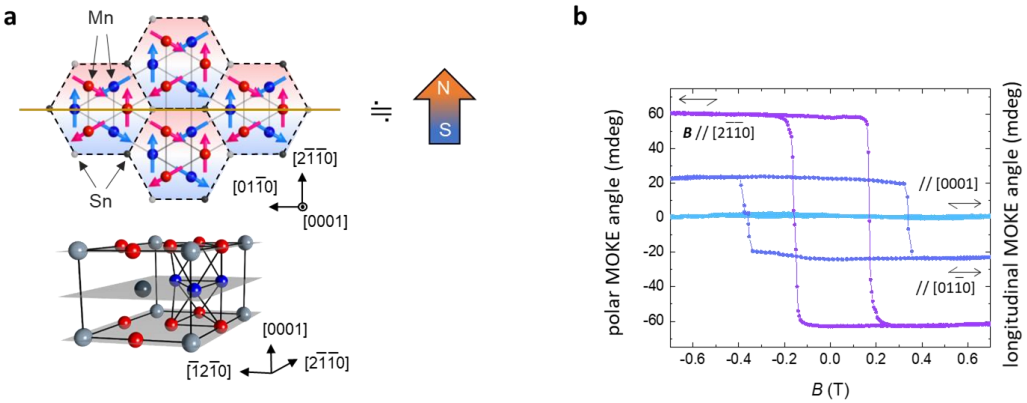

Fig. 1 **a,** Spin and crystal structures of $D0_{19}$-Mn_3Sn. **b,** Results of static MOKE.