Seminar

December 10 (Thu.) 2026, 15:00 ~ 16:00

IMR, 2nd Bldg. Auditorium (金属材料研究所 2号館講堂)

Combining the best of all worlds: Altermagnets – a new class of magnets

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While known for a long time, antiferromagnetically ordered systems have previously been considered, as “interesting but useless” because they are difficult to read out [1] and to control [2]. To overcome these problems, we develop altermagnetic materials [3,4]. This recently identified class magnets with collinear antiferromagnetic magnetic order combines the best of antiferromagnets and ferromagnets exhibiting spin splitting and particular spin transport properties and torques [3]. Here we demonstrate the spin splitting in RuO_2 and CrSb [4] und analyze particular symmetries of the Hall signal in the altermagnet hematite where we can also quantify altermagnetic domains by XMCD & XMLD imaging [5].
Finally we show that the spin splitting also manifests in the magnonic band structure leading to altermagnetic spin transport in insulating d-wave altermagnets [6].

Reference

[1] S. Bodnar et al., Nature Comm. 9, 348 (2018); S. Bommanaboyena et al., Nature Comm. 12, 6539 (2021).
[2] H. Meer et al., Nano Lett. 21, 114 (2020); C. Schmitt et al., Nano Lett. 24, 1471 (2024).
[3] L. Smejkal et al., Phys. Rev. X 12, 040501 (2022) ; A. Akashdeep et al., Appl. Phys. Lett.128, 022406 (2026).
[4] O. Fedchenko et al., Sci Adv. 10, adj4883 (2024); S. Reimers et al., Nature Commun. 15, 2116 (2024).
[5] E. Galindez-Ruales et al., Adv. Mater. 37, e05019 (2025) ; .
[6] E. Galindez-Ruales et al., arxiv :2508.14569 ; S. Das et al., Nature Commun. 13, 6140 (2022).



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