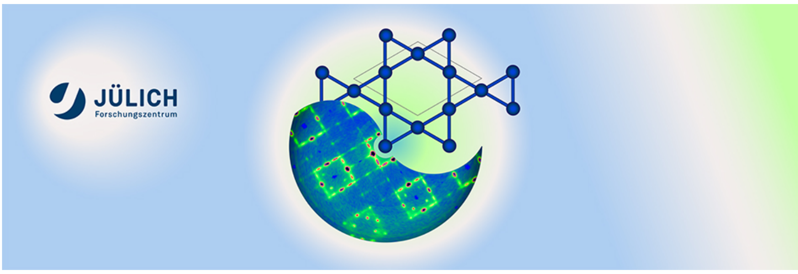

Beitrag ID: **70**

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Chiral magnons and anisotropic damping in metallic g-wave altermagnets

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Altermagnets represent a novel class of magnetic materials that bridge the gap between conventional ferro- and antiferromagnets. A unique feature of altermagnets is the lifting of degeneracy of their spin-wave modes (magnons) along the same crystallographic directions in which electronic bands also exhibit spin splitting. This non-degeneracy leads to chirality and directional anisotropy in spin-wave dispersions. We study the interplay between electronic band spin splitting and chiral magnon excitations in a series of metallic g-wave altermagnets (\(MZ\), where \(M\)= V, Cr; \(Z\)= As, Sb, Bi) using the density functional theory and many-body perturbation theory [1]. We find that magnon damping due to Stoner excitations is highly wavevector-dependent, reaching substantial values in specific Brillouin zone regions. Among the compounds studied, CrSb exhibits the strongest chiral magnon band splitting. Recent RIXS experiments [2] on CrSb confirmed the presence of polarization-dependent magnon modes but lacked the energy resolution necessary to resolve the theoretically predicted 52 meV magnon splitting. In contrast, inelastic neutron scattering (INS) provides both the momentum and energy resolution required to test these predictions. Furthermore, our calculations reveal that VSb hosts low-energy chiral-split magnons (with energies up to 80 meV and a splitting of approximately 40 meV), placing them well within the detection range of modern INS techniques. With an appropriate choice of lattice parameters, the ground state of VSb can be stabilized in a collinear antiferromagnetic configuration. These findings position our MZ compounds as promising candidates for future INS studies focused on chiral magnon transport, directional damping, and the broader application for spintronic and magnonic devices.

[1] E. Sasioglu et al., Phys. Rev. B 81,054434 (2010).
[2] N. Biniskos et al., arXiv:2503.02533 (2025).

Autor: BEIDA, Wejdan (Forschungzentrum Jülich)

Co-Autoren: Dr. FRIEDRICH, Christoph (Forschungzentrum Jülich); Dr. SASIOGLU, Ersoy (Martin Luther University Halle-Wittenberg); Dr. BIHLMAYER, Gustav (Forschungzentrum Jülich); Prof. BLUEGEL, Stefan (Forschungzentrum Jülich); Prof. MOKROUSOV, Yuiry (Forschungzentrum Jülich)

Vortragende(r): BEIDA, Wejdan (Forschungzentrum Jülich)

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