Universität Bielefeld Fakultät für Physik

Condensed Matter Theory

Seminar

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14.00 Probing and utilizing spin-electric couplings in molecular magnets

Molecular magnets have been demonstrated as promising candidates for quantum-coherent nanodevices, due to their long relaxation times and design flexibility. They are most typically investigated and operated using Electron Paramagnetic Resonance. However, relying only on the intrinsic coupling between their spins and the magnetic field while building quantum presents a challenge, as magnetic fields, unlike electric fields, are not easily constrained to required length scales. Using modified Hahn echo microwave pulse sequences incorporating static electric fields, we investigated electric field sensitivity and its origins in several molecular magnets, such as Cu3 frustrated triangles[1], Cr7Mn rings [1], and HoW10 crystals[2][3], aiming to find the key to the design of a magnetic molecule that may be operated with electrical means. We discover couplings sufficient to use an electric field to address subpopulations of molecular spins by modifying their operating frequencies and demonstrate such selection experimentally.

[1] J. Liu, J. Mrozek et al., Phys. Rev. Lett 2019, 122, 037202
[2] J. Liu, J. Mrozek et al., Nature Physics 2021, 17, 12051209
[3] M. Shiddiq et al., Nature 2016 531, 348351

Friday, 03.06.2022, 14:00 Uhr
Zoom