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Emergent Quantum Materials and Technologies

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Harnessing Local Inversion Symmetry Breaking for 3D Nano Magnetism

ABSTRACT

Short-range order, strain, and curvature in solid state materials have a profound impact on spin-orbit coupling and play an important role in electronic and magnetic properties of magnetic and quantum materials [1]. While applications, e.g., flexible electronics and robotics [1,2], have become more prominent, the vast majority of research efforts concern fundamental aspect [3], such as synthesis and nanofabrication of 3D architectures [4,5], and advancing characterization techniques. In this talk, I will discuss our more recent works on strain engineering and disordered dipole- and exchange-coupled materials [6,7], including chiral spin textures in amorphous materials [6], ferromagnetic liquid droplets [5], low spin-damping materials [8], and spin-crossover molecular films [9].

BIO

Robert Streubel leverages local inversion symmetry breaking in solid-state materials to tailor magnetic and magneto-transport properties in nanostructures, amorphous materials, and molecular magnets. Robert graduated in 2011 from the TU Dresden, Germany with a Physics Diplom (M.S.) and received his doctoral degree (Dr. rer. nat.) in Physics in 2015 from TU Chemnitz, Germany for his work carried out at the Leibniz Institute for Solid State and Materials Research Dresden, Germany. Before joining the University of Nebraska-Lincoln in 2020 as an Assistant Professor in the Department of Physics and Astronomy, he worked as a post-doctoral researcher at Berkeley Lab's Materials Sciences Division. Robert has been recognized as an Emerging Leader (J. Phys. Condensed Matter, 2020) and an Emerging Investigator (Nanoscale, 2023).

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