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Spin-boson coupling with chirality

Many-body fermion-boson coupling can enable nontrivial quantum phases with unusual properties. For example, spin-lattice coupling may allow phonons to acquire a stronger magnetic response than the electrons themselves. In this talk, I will first discuss the concept of chiral phonons in this many-body framework, and introduce our experimental demonstration of chiral phonon-induced spin dynamics in materials with weak or strong spin exchange interactions. Then, I will introduce our recent progress in time-resolved THz spectroscopy to understand magnon-phonon coupling under magnetic order, which can also be extended to charge or structural orders. Such coupling is not only a material's intrinsic parameter but can potentially be altered by the environment through strong coupling with photons. Lastly, I will overview our recent efforts to realize such cavities using surface phonon-polaritons. Our results call for further theoretical and experimental investigations into dynamic structure-property relationships and open promising avenues for on-demand modification of low-energy physics in quantum materials.

Monday, June 1st

15:30 CET

Seminar room EG 136, Bldg. 900 (MPSD)