



Seminar

Resonant thermal Hall effect of phonons coupled to dynamical defects

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Time: 3:00pm, Aug. 17, 2022 (Wednesday)

时间: 2022年8月17日 (周三) 下午3:00

Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Recent thermal transport measurements in various materials including pseudogap cuprates have observed large thermal Hall effects which are attributed to phonons. In this talk, I will review some recent experiments and propose a theory of phonon thermal Hall effect based on resonant scattering of phonons off dynamical defects. Using a microscopic formulation based on the Kubo formula, we find that the leading contribution perturbative in the phonon-defect coupling is proportional to the phonon lifetime. This contribution is at resonance when the phonon energy equals a defect level spacing. Our results are obtained for different defect models, and include a model of an impurity quantum spin in the presence of quasi-static magnetic order with an isotropic Zeeman coupling to the applied field, which we propose applies to the cuprate pseudogap regime.

About the speaker

Haoyu Guo spent his first-year undergraduate at Peking University before transferring to MIT. He is currently attending graduate study at Harvard University under the supervision of Prof. Subir Sachdev with a focus on exotic transport behaviors in strongly correlated systems and materials.