

## CONDENSED MATTER THEORY SEMINAR

Subject: **Angular momentum of phonons and magnons, and effective fields in adiabatic spin dynamics**

Speaker: **Dr. Simon Streib (University Uppsala, Sweden)**

Date & time: **Friday, June 18<sup>th</sup>, 2021 at 3:15 p.m.**

Venue: **Online Seminar**

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In the first part of my talk, I consider the angular momentum of phonons and magnons, in particular the difference between their angular momentum and pseudo angular momentum [1]. Based on Noether's theorem, I show that recently discussed orbital angular momenta of phonons and magnons are pseudo angular momenta. The conceptual difference between angular momentum and pseudo angular momentum is important for a proper understanding of the transfer of angular momentum in condensed matter systems, for example in spintronics applications.

In the second part, I present recent results on the derivation of effective magnetic fields from electronic structure calculations within the adiabatic approximation for spin degrees of freedom [2]. I discuss the "constraining field theorem" that relates the energy gradient and constraining fields which arise in the context of this adiabatic approximation. Based on this theorem, I explain why the effective magnetic field obtained from the energy gradient and the constraining field are not equivalent in the case of density functional theory, contrary to previous statements in the literature.

[1] S. Streib, Phys. Rev. B 103, L100409 (2021).

[2] S. Streib et al., Phys. Rev. B 102, 214407 (2020), Editors' Suggestion.