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Phonons at Electronic Phase Transitions

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Lattice vibrations, i.e., phonons are ubiquitous in solids and getting detailed knowledge on them was one of the success stories of early inelastic neutron scattering. Nowadays, large neutron detectors along with *ab-initio* lattice dynamical calculations allow comprehensive experimental and theoretical mapping of phonon properties. However, calculations of lattice dynamics at or close to phase transitions in solids are still challenging. On the other hand, corresponding experimental investigations continue to reveal new insights into the driving mechanisms of these phase transitions.

In my talk, I will present our work using phonon spectroscopy in materials featuring electronic phase transitions such as conventional and unconventional superconductivity, nematic order and metal insulator transitions. The results will highlight the strong coupling of phonons to other excitations whereby phonon spectroscopy is able to reveal details on electronic and/or magnetic degrees of freedom.

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