

**Tuesday, 12<sup>th</sup> November 2019, 13:00**

**Campus Schenefeld, XHQ, room E1.173** (coffee & biscuits will be served at 12:30)

# **Hugh Simons**

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## **Phonon photography?**

Phonons are collective, wave-like motions of elastic lattice distortions that give rise to many of the material phenomena we take for granted, such as heat conduction and phase transitions. It therefore comes as no surprise that understanding the motion and, in particular, the interactions of phonons in materials is critical to how we use, produce and design materials. The problem is that we can't see these phonons directly; they're too small, too fast and too sensitive to their elastic boundary conditions for conventional imaging techniques. Here I propose a possible solution to this problem: a full-field hard XFEL diffraction microscope, with which phonons could be observed directly as strain waves in a single acquisition by a femtosecond XFEL pulse. Realizing this will undoubtedly require addressing numerous challenges in terms of both instrumentation and analysis. However, I will show that our proof-of-principle experiments suggest it might just be feasible.

**Host:** Serguei Molodtsov