

# Anomalous phonon dispersion in $\text{Nd}(2-x)\text{Ce}(x)\text{CuO}(4)$ studied by inelastic x-ray scattering

Wednesday, 4 December 2019 12:20 (25 minutes)

Understanding the charge-ordering tendencies exhibited by the cuprates might give valuable insight into the origin of superconductivity in these complex oxides. The charge correlations may appear to manifest themselves as an anomalous dispersion (softening) of the longitudinal Cu–O bond-stretching phonon mode both in the hole-doped [1,2] and electron-doped cuprates [3]. In electron-doped  $\text{Nd}_{2-x}\text{Ce}_x\text{CuO}_4$ , the Charge Density Wave (CDW) order was found at the two-dimensional wave vector  $(H,K) \approx (0.2,0)$ , approximately the same wave vector at which an anomalous optical phonon dispersion was observed [3]. I will present our temperature and doping depended inelastic x-ray scattering (IXS) studies of the optical phonon anomaly. I will discuss it in the context of the CDW order in this compound. Our IXS studies will be furthermore compared with the DFT calculations performed for the parent compound  $\text{Nd}_2\text{CuO}_4$ .

## Refs

- [1] D. Reznik *et al.*, Nature **440**, 1170 (2006).
- [2] D. Reznik, Physica C **481**, 75 (2012).
- [3] M. d'Astuto *et al.*, Phys. Rev. Lett. **88**, 167002 (2002).

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**Track Classification:** Experiments