**Title: Anharmonic vibrations of superionic conductors**

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Ionic transport in conventional (non-superionic) solids is usually considered as a sequence of discrete "hops", where mobile ions undergo stochastic moves between available crystallographic sites [1]. While this model is usually appropriate for ionic solids with low-to-medium ionic conductivities, fast ionic conduction is often associated with highly-concerted ionic motion, in which groups of ions undergo cooperative near-simultaneous motion [2]. This observational correlation between fast-ion conduction and cooperative ion-transport mechanisms suggests that ionic motion in superionic conductors might be better described in terms of appropriate collective degrees of freedom, rather than independent single-atom coordinates [3]. One appealing choice of basis for describing collective dynamics in a crystal is the set of normal modes of vibration, which correspond to phonon eigenvectors. It has also been proposed that superionic transitions are accompanied by the breakdown of specific phonon modes linked to characteristic diffusion processes [4]. Any changes in vibrational properties across the superionic transition may therefore also provide insights into the underlying physics of this phenomenon. Here, I will discuss progress in this direction with a particular focus on the superionic conductor Li3N [5].

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