

Abstract Submitted  
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**Inelastic X-ray Investigation of the Phonon Softening in NbSe<sub>2</sub>**  
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We investigated the phonon softening in the charge density wave compound NbSe<sub>2</sub>  
using the high-resolution hard inelastic x-ray scattering beamline 30-ID-C at the Ad-  
vanced Photon Source, Argonne National Laboratory. The two lowest  $\Sigma_1$  phonon  
branches were measured from the zone center  $\Gamma$  to the M point at temperatures  
between 250 K and 7 K across the CDW transition at  $T_{CDW} = 33$  K. Density func-  
tional calculations for the lattice dynamical properties which predict an extended  
phonon breakdown are used to analyze the detailed nature of the softening phonon  
branch. Work supported by US DOE BES-DMS DE-AC02-06CH11357.

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