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**Comparing the anomalous phonons in Fe(Te,Se) and (Fe,Ni)(Te,Se) via neutron scattering** JOHN SCHNEELOCH, Brookhaven National Laboratory, ZHIJUN XU, University of California, Berkeley, GENDA GU, IGOR ZALIZNYAK, Brookhaven National Laboratory, BARRY WINN, Oak Ridge National Laboratory, JOSE RODRIGUEZ-RIVERA, National Institute of Standards and Technology, ROBERT BIRGENEAU, University of California, Berkeley, GUANGYONG XU, JOHN TRANQUADA, Brookhaven National Laboratory — We studied the anomalous acoustic-type phonons in the Fe(Te,Se) iron-based superconductor family that arise from the (100) Bragg peak, which is forbidden according to the reported crystal structure for these materials. Inelastic neutron scattering was performed on superconducting and non-superconducting crystals of various compositions. The (100) phonons were much weaker in a non-superconducting nickel-doped crystal than in a superconducting crystal with similar selenium fraction, but comparison with another non-superconducting crystal suggests the difference is not simply related to superconductivity. This composition dependence was observed for both transverse and longitudinal phonons. The temperature dependences of the (100) phonons resembled those of conventional phonons. We will discuss these results and possible explanations for the relation between composition and lattice dynamics in this system.

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