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Imaging Charge Density Wave Nucleation in NbSe₂ ETHAN ROSENTHAL, CARLOS ARGUELLO, SUBBIAH CHOCKALINGAM, WOO CHANG CHUNG, LIUYAN ZHAO, CHRISTOPHER GUTIERREZ, JOON HO KANG, ABHAY PASUPATHY, Columbia University, SHUANG JIA, ROBERT CAVA, Princeton University — Understanding the effects of spatial inhomogeneity in complex materials is necessary to achieve a fundamental understanding of their quantum states. NbSe₂ serves as a clean and relatively simple system for understanding the emergence of one such state – the charge density wave (CDW) phase. Using variable temperature scanning tunneling microscopy (STM), we visualize the nucleation of CDWs about crystal defects at temperatures well above T_{CDW} . The CDW correlation length increases with decreasing temperature, until global order is reached below T_{CDW} . We also employ scanning tunneling spectroscopy in order to visualize the energy-dependent, spatial phase of the CDW state. With both topographic and spectroscopic data, we will provide a clear picture of the CDW transition and insight into the microscopic mechanisms at work.

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