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X-ray Diffraction measurements of the CDW phase in doped $TiSe_2$ and $NbSe_2$ J.P. CASTELLAN, Argonne Nat. Lab, C.D. MALLIAKAS, Northwestern University, M. LAVARONE, S. ROSENKRANZ, Argonne Nat. Lab, R. OSBORN, Argonne Nat. Lab., F. WEBER, Argonne Nat. Lab — Layered transition metal chalcogenides display a phase diagram similar to that of high Tc superconducting materials. In high Tc materials the superconductivity coincides with the suppression of magnetic order. In the case of $TiSe_2$ and $NbSe_2$ the onset of superconductivity involves a charge density wave (CDW) rather than magnetic order. The phase diagram of doped $TiSe_2$ and $NbSe_2$ has so far been interpreted as a competition of the CDW order and superconductivity order parameters. Another interpretation is that the softening of the excitons responsible for the CDW order enables the superconductivity. We have measured diffuse scattering associated with the fluctuations in the order parameter of the CDW on either side of the quantum phase transition using X-ray scattering. We will present the behavior of the critical exponents as the quantum phase transition is approached and discuss whether there is a coupling of the CDW and superconducting order parameters. Work supported by US DOE BES-DMS DE-AC02-06CH11357

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