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Revealing the local structure of the charge-density-wave material, $CeTe_3$, using atomic pair distribution function analysis H.J. KIM, S.J.L. BILLINGE, D. BILC, S.D. MAHANTI, Department of Physics & Astronomy, Michigan State University, Biomedical Physical Sciences Building, East Lansing, Michigan 48824, D. WERMEILLE, Department of Physics & Astronomy, Iowa State University, Ames, Iowa 50011, D. ROBINSON, Argonne National Laboratory, Chicago, Illinois 60439, C. MALLIAKAS, M.G. KANATZIDIS, Department of Chemistry, Michigan State University, Chemistry Building, East Lansing, Michigan 48824 — $CeTe_3$ is a layered charge density wave material whose Te square nets undergo a Peierls distortion. Formation of the CDW in this material has been validated through observing superlattice reflections by single crystal x-ray diffraction and Fermi surface nesting by ARPES. However, this electronically driven structural distortion is difficult to measure and has not been previously elucidated. We were recently able to solve this using single crystal x-ray diffraction for the first time. In addition, the *local* structure of $CeTe_3$ has been studied using the atomic pair distribution function analysis of x-ray powder diffraction data. The study shows that the local structure of $CeTe_3$ is more distorted than the average structure. Interestingly, a bimodal Te-Te bond-length distribution of Te nets is found from the local structural model whereas a Gaussian like distribution from the average structural model. We will discuss how the local and average structures can be reconciled by the existence of structural disorder in the Te network.

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