

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Evidence for coupling between charge-density-wave and phonons in two-dimensional rare-earth tri-tellurides M. LAVAGNINI, ETH-Zurich, M. BALDINI, La Sapienza Rome, A. SACCHETTI, ETH-Zurich, D. DI CASTRO, La Sapienza Rome, B. DELLEY, PSI Villigen, R. MONNIER, ETH-Zurich, J.H. CHU, N. RU, I.R. FISHER, Stanford University, P. POSTORINO, La Sapienza Rome, L. DEGIORGI, ETH-Zurich — We report on a Raman scattering investigation of the charge-density-wave (CDW), quasi two-dimensional rare-earth tri-tellurides $R\text{Te}_3$ ($R = \text{La, Ce, Pr, Nd, Sm, Gd}$ and Dy) at ambient pressure, and of LaTe_3 and CeTe_3 under externally applied pressure. The observed phonon peaks can be ascribed to the Raman active modes for both the undistorted as well as the distorted lattice in the CDW state by means of a first principles calculation. The latter also predicts the Kohn anomaly in the phonon dispersion, driving the CDW transition. The integrated intensity of the two most prominent modes scales as a characteristic power of the CDW-gap amplitude upon compressing the lattice, which provides clear evidence for the tight coupling between the CDW condensate and the vibrational modes.

L. Degiorgi
ETH-Zurich

Date submitted: 09 Nov 2008

Electronic form version 1.4