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Scanning tunneling microscopy study of the charge density wave in rare-earth tritellurides[1] ALEKSANDRA TOMIC, CHRISTOS MALLIAKAS, HYUN-JEONG KIM, MERCOURI KANATZIDIS, SIMON BILLINGE, STUART TESSMER, Michigan State University — A number of correlated electron oxides exhibit surprisingly intricate ordered density modulations which underlie their novel properties. These modulations arise from incommensurate charge density waves (IC-CDWs). We have applied scanning tunneling microscopy (STM) to study the nature of IC-CDWs in the rare- earth tritellurides – simple, cleavable, layered materials. In particular, for CeTe3 we have observed both the atomic lattice of surface Te atoms and the CDW modulations oriented at 45 degrees with respect to the Te net. Two-dimensional Fourier transforms of the STM images were obtained to search for discommensurations. These are essentially domain walls whose presence has been strongly suggested by atomic pair distribution function studies. We observe satellite peaks in addition to the principal CDW peaks. These represent strong evidence for the presence of discommensurations with a characteristic length scale of about 38 angstroms.

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