Rosenkranz, Osborn, and Van Wezel Reply

Rosenkranz, S.; Osborn, R.; Van Wezel, J.

DOI
10.1103/PhysRevLett.122.229702

Publication date
2019

Document Version
Final published version

Published in
Physical Review Letters

Citation for published version (APA):
https://doi.org/10.1103/PhysRevLett.122.229702

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Rosenkranz, Osborn, and Van Wezel Reply: We offer a reply to the preceding Comment [1] on our earlier work [2] concerning the chiral phase transition in charge ordered 1T-TiSe$_2$. We argue the interpretation in the Comment to be inconsistent both with the data presented in the original work and with more recent direct observations of broken inversion symmetry in 1T-TiSe$_2$. The Comment offers an alternative interpretation that addresses part of the x-ray data in our original work, but it is incompatible both with the behavior of other physical observables that we presented [2] and with recent direct observations of the broken inversion symmetry in 1T-TiSe$_2$ [3].

The fact that isolated experimental observations are generically open to interpretation is not in and of itself an indication that any particular interpretation is flawed. Multiple ways of interpreting the one figure reproduced in this Comment may exist. However, the reproduced figure contains only part of the data presented in Ref. [2]. The alternative interpretation the authors of the Comment give for the one isolated figure is in fact inconsistent with the rest of the data presented in the original article [2]. That is, assuming their alternative interpretation that there is only a single transition in 1T-TiSe$_2$, it is not possible to explain the two kinks in the specific heat or the two anomalies in the resistance, both measured on the same sample as used for the x-ray experiment, and both occurring at the same second transition temperature 7 K below the main transition temperature.

Our original interpretation [2] was based on three sets of different physical properties (x-ray data, specific heat, electrical resistance), providing a consistent explanation for that entire set of observations. In contrast, the alternative interpretation presented in the Comment [1] does not give a consistent explanation of the entire dataset.

Finally, we would like to point out that direct evidence for the breakdown of inversion symmetry in 1T-TiSe$_2$, consistent with the presence of a chiral charge density wave, was recently reported on the basis of circularly polarized photogalvanic effect measurements [3].

Stephan Rosenkranz,1 Ray Osborn1 and Jasper van Wezel2,*
1Materials Science Division, Argonne National Laboratory
Argonne, Illinois 60439, USA
2Institute for Theoretical Physics Amsterdam
University of Amsterdam
Science Park 904, 1098 XH Amsterdam, The Netherlands

Received 18 April 2019; published 6 June 2019
DOI: 10.1103/PhysRevLett.122.229702

*M vanwezel@uva.nl