O 89: Invited talk (Aebi, Philipp)

Time: Friday 13:30–14:15 Location: H36

Invited Talk O 89.1 Fri 13:30 H36

Evidence for exciton condensation in layered TiSe2: A photoemission study — •Philipp Aebi — Département de Physique, Université de Fribourg, Switzerland

There is a longstanding open question about the existence of a condensate of electron-hole pairs (excitons) in a way as it is well-known for pairs of electrons, Cooper-pairs, in superconductivity. TiSe2 exhibits an unusual temperature-dependence in transport experiments and a specific band configuration that has been related to the possible formation of excitons.

Here we present a temperature dependent, high-resolution angle-resolved photoemission study of 1T-TiSe2. The material undergoes a phase transition from its room-temperature, normal phase to a low-temperature, charge-density wave phase. At low temperature the photoemission spectra are strongly modified, with large band renormalisations at high-symmetry points of the Brillouin zone and a very large transfer of spectral weight to backfolded bands.

A calculation of the theoretical spectral function for an exciton phase using a BCS-like formalism reproduces the experimental features with very good agreement. This gives strong evidence in favour of the exciton phase in 1T-TiSe.