Three-Dimensional Nature of Charge-Density Wave in Kagome Superconductor KV_3Sb_5 Studied by ARPES

T. Kato [1], Y. Li [2,3], T. Kawakami [1], M. Liu [2,3], K. Nakayama [1,4], Z. Wang [2,3], A. Moriya [1], K. Tanaka [5,6], T. Takahashi [1,7,8], Y. Yao [2,3], and T. Sato [1,7,8,9]

[1] Department of Physics, Graduate School of Science, Tohoku University, Sendai, Japan
[2] Centre for Quantum Physics, Key Laboratory of Advanced Optoelectronic Quantum Architecture and Measurement (MOE), School of Physics, Beijing Institute of Technology, Beijing, China
[3] Beijing Key Lab of Nanophotonics and Ultrafine Optoelectronic Systems, Beijing Institute of Technology, Beijing, China
[4] Precursory Research for Embryonic Science and Technology (PRESTO), Japan Science and Technology Agency (JST), Tokyo, Japan
[5] UVSOR Synchrotron Facility, Institute for Molecular Science, Okazaki, Japan
[6] School of Physical Sciences, The Graduate University for Advanced Studies (SOKENDAI), Okazaki, Japan
[7] Center for Spintronics Research Network, Tohoku University, Sendai, Japan
[8] Advanced Institute for Materials Research (WPI-AIMR), Tohoku University, Sendai, Japan
[9] International Center for Synchrotron Radiation Innovation Smart (SRIS), Tohoku University, Sendai, Japan

Kagome lattice which consists of a two-dimensional network of corner-sharing triangles provides an excellent platform for exploring new quantum phenomena arising from electronic correlations and non-trivial band topology. Recently, a family of AV_3Sb_5 (AVS: A = K, Rb, Cs) has been discovered to be a novel kagome superconductor with superconducting transition temperature T_c of 0.92-2.5 K [1-3]. In addition, AVS shows charge-density wave (CDW) below T_{CDW} = 78-103 K, and attracts much attention because of the possible unconventional nature of CDW and its interplay with superconductivity and non-trivial topology. On the other hand, the electronic states relevant to the CDW formation are still under intensive debate and the mechanism of CDW and superconductivity is still far from being established.

In this study, we have investigated the three-dimensional electronic structure of KV_3Sb_5 by photon-energy-tunable angle-resolved photoemission spectroscopy (ARPES) [4] and established the multi-orbital nature of the valence band structure in KV_3Sb_5 [Fig. 1]. Our high-resolution measurements also revealed a drastic electronic reconstruction and an energy gap opening triggered by the CDW transition. We will also report the CDW-gap anisotropy in the three-dimensional momentum space and discuss the mechanism of CDW.

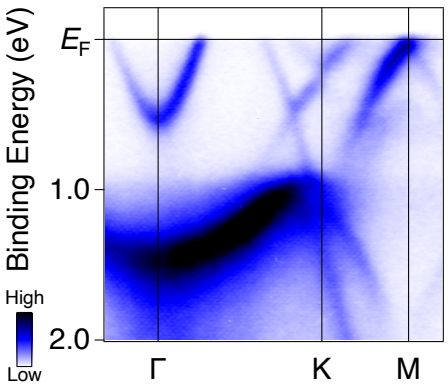

Fig. 1: *ARPES intensity plot along the ΓKM cut for KV_3Sb_5 measured with hv = 114 eV at T = 120 K.*

References

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