Surface state van Hove singularity effect to bulk electron-bosonic mode coupling in Sr$_2$RuO$_4$

CHUL KIM, Institute of Physics and Applied Physics, SEUNG RYONG PARK, C. S. LEEM, D. J. SONG, Y. K. KIM, S. K. CHOI, W. S. JUNG, Y. Y. KOH, W. S. KYUNG, G. R. HAN, H. Y. CHOI, Institute of Physics and Applied Physics, Yonsei University, Y. YOSHIDA, Nanoelectronics Research Institute, AIST, R. G. MOORE, Stanford Synchrotron Radiation Lightsource, SLAC, CHANGYOUNG KIM, Institute of Physics and Applied Physics, Yonsei University — Discovery of spin triplet superconductivity in Sr$_2$RuO$_4$ brought attention to the electronic structure studies on the system, especially by using angle resolved photoemission (ARPES). There are three bands that cross the Fermi level. The system is particularly interesting because these bands have different orbitals with different characters such as dimensionality. Along the way, it was found that there are surface states due to RuO$_6$ octahedral rotation on the surface layer. RuO$_6$ octahedral rotation results in a dramatic change in the surface electronic structure such as van Hove singularity. By controlling temperatures, we can traverse or kill the van Hove singularity in the surface electronic states. Through comparison of measured bulk electronic structures at different temperatures, we elucidate the effect of surface state van Hove singularity to bulk electron-bosonic mode coupling. We will discuss the importance of the surface states in interpretation of bulk properties measured by ARPES.