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Rashba type band splittings in ferroelectric semiconductor α-GeTe(111) BEOMYOUNG KIM, HYUNGJU OH, YEONGKWAN KIM, JONATHAN DENLINGER, Lawrence Berkeley Natl Lab, CHANGYOUNG KIM, Department of Physics and Astronomy, Seoul National University, Seoul 151747, Republic of Korea — There has been significant increase in the research of spin orbit coupling (SOC) induced exotic phenomena. The Rashba effect, theoretically predicted to exist, is one of the SOC related phenomena. The phenomenon was later experimentally observed in the surface states of metals and topological insulators as well as interfaces of hetero structures that have inversion symmetry breaking (ISB). Even bulk states with intrinsic ISB such as BiTeI is found to have Rashba split bands. It was very recently proposed that ferroelectric GeTe has Rashba effect in the bulk. This is a unique situation where ISB is provided not by the structure ISB but by an electrical polarization. We have performed angle-resolved photoemission spectroscopy (ARPES) on GeTe single crystals to investigate the unique bulk Rashba state. Our results indeed show the existence of a Rashba-type band splitting as theoretically predicted. We discuss various aspect of the Rashba states in ferroelectric semiconductor α-GeTe(111).

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