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Circular Dichroism and Spin Polarization of Rashba Split Surface States on a Bi/Ag Surface Alloy GUANG BIAN, LONGXIANG ZHANG, YANG LIU, T. MILLER, T.-C. CHIANG, University of Illinois at Urbana-Champaign — The Bi/Ag surface alloy possesses a huge Rashba splitting in its surface bands due to the prominent corrugation in the surface reconstruction and the large atomic spin-orbit coupling of the Bi atom. This system is an intriguing candidate to realize the 2D p_x+ip_y superconductor and further, Majorana states. In this work, we study the electronic structure of the Bi/Ag surface alloy prepared by depositing Bi onto ultrathin Ag films followed by annealing. The electronic structure of the system is measured using circular angle resolved photoemission spectroscopy (CARPES). The results reveal two interesting phenomena: the hybridization of spin polarized surface states with Ag bulk quantum well states and the umklapp scattering by the perturbed surface potential. In addition, our CARPES spectra show clearly a unique dichroism pattern which is closely related to the spin texture of this 2D strongly spin-orbit coupled electron system.

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