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Spin-orbit dichroism in SX-ARPES of Pt(111)¹ JUN MIYAWAKI, ASHISH CHAINANI, YASUTAKA TAKATA, MASAKI OURA, RIKEN SPring-8 Center, YASUNORI SENBA, HARUHIKO OHASHI, JASRI/SPring-8, SHIK SHIN, RIKEN SPring-8 Center, ISSP Univ. Tokyo — We study the bulk electronic structure of Pt(111) using polarization dependent soft x-ray (SX)-ARPES ($h\nu=450\text{--}610$ eV). Pt is known to exhibit the largest spin Hall conductivity of all metals, which is derived from its large spin orbit coupling [1,2]. We have measured band dispersions along Γ -K-X ($h\nu=466$ eV) with clockwise and counterclockwise circularly polarized x-rays and obtained circular dichroism (CD) in the valence band of Pt. A comparison with calculated band dispersions including spin-orbit coupling gives a very good match with the experimental results [3,4], thus establishing the role of spin-orbit coupling in the electronic structure of Pt. Our results also identify (i) a hybridization gap with symmetry switching dichroism and (ii) strong CD of bands at the Fermi level, which provide the carriers responsible for SHE.

[1] T. Kimura, *et al.*, Phys. Rev. Lett. **98**, 156601 (2007). [2] M. Morota, *et al.*, arXiv:1008.0158v1. [3] G. Y. Guo, *et al.*, Phys. Rev. Lett. **100**, 096401 (2008). [4] A. D. Corso and A. M. Conte, Phys. Rev. B **71**, 115106 (2005).

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