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Electronic structure of semi-metallic PtSe2 investigated with spin- and angle-resolved photoemission JIAGUI FENG, O. CLARK, L. BAWDEN, I. MARKOVI, D. BISWAS, L. COLLINS-MCINTYRE, SUPA, School of Physics and Astronomy, University of St Andrews, St Andrews, Fife KY16 9SS, UK, M. S. BAHRAMY, Quantum-Phase Electronics Center and Department of Applied Physics, The University of Tokyo, Tokyo 113-8656, Japan, PHIL D. C. KING, SUPA, School of Physics and Astronomy, University of St Andrews, St Andrews, Fife KY16 9SS, UK — The observation of extremely high and non-saturating magnetoresistance has sparked a renewed interest in compensated electron and hole pocket semimetals [1]. Here, we will present direct electronic structure measurements of 1T-structured PtSe2, a transition-metal dichalcogenide (TMD) compound. This was previously predicted to be semi-metallic with co-existing electron and hole pockets making up its the Fermi surface [2], but the details of its band structure have remained elusive to date. Unlike more intensely studied TMDs such as NbSe2 /MoS2, its low-energy electronic structure is predicted to be dominated by chalcogen p-orbital, rather than transition-metal d-orbital, derived states. Nonetheless, we will show how spin-orbit coupling in the chalcogen shell still plays a major role in shaping its underlying electronic structure. Combining spin- with angle-resolved photoemission spectroscopy, we uncover its bulk electronic structure as well as revealing the formation of a number of topologically-protected states in this system. [1] M. N. Ali, et al. Nature 514, 205208 (2014). [2] D. Dai, et al. J. Solid State Chem. 173, 114 (2003).

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