Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Topological Ladders in Transition-Metal Dichalcogenides** O. J. CLARK, Univ of St Andrews, M. S. BAHRAMY, Univ of Tokyo & RIKEN, J. FENG, L. BAWDEN, J. M. RILEY, V. SUNKO, I. MARKOVIĆ, F. MAZZOLA, D. BISWAS, Univ of St Andrews, K. OKAWA, T. SASAGAWA, Tokyo Institute of Tech., G. BALAKRISHNAN, Univ of Warwick, T. EKNAPAKUL, W. MEEVASANA, Suranaree Univ of Tech., P. D. C. KING, Univ of St Andrews —

Transition metal dichalcogenides (TMDs) host a rich variety of material properties, from spin-orbit coupled semiconductors to charge density-wave systems and superconductors [1,2]. The stabilisation of their varied ground states is largely thought to be driven by d-orbital physics of their transition-metal derived bands. Here, by combining spin- and angle-resolved photoemission spectroscopy (ARPES) with first-principles calculations, we show that band inversions within the chalcogen p-orbital manifold alone can cause TMDs to also host topological phenomena. First, we uncover a 3D tilted Dirac fermion and multiple topologically non-trivial surface states within the model system 1T-$PdTe_2$ where the p- and d-orbital bands are well separated in energy. We show, however, that the same topological signatures persist even within the more well-studied, d-band dominated members of the TMD classification. Through this, we firmly establish non-trivial band topologies as a generic feature of transition-metal dichalcogenides. [1] X. Xu, Nature Phys. 10 (2014) 343; [2] M. Chhowalla, Nature Chem. 5 (2013) 263.

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Date submitted: 10 Nov 2016 Electronic form version 1.4