Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Trivial and topological Fermi arcs in the type-II Weyl semimetal candidate MoTe2 ANNA TAMAI, Department of Quantum Matter Physics, University of Geneva, Switzerland, QUANSHENG WU, Theoretical Physics and Station Q Zurich, ETH Zurich, Switzerland, IRENE CUCCHI, FLAVIO BRUNO, CELINE BARRETEAU, ENRICO GIANNINI, Department of Quantum Matter Physics, University of Geneva, Switzerland, ALEXEY SOLUYANOV, Theoretical Physics and Station Q Zurich, ETH Zurich, Switzerland, FELIX BAUMBERGER, Department of Quantum Matter Physics, University of Geneva, Switzerland — Weyl semimetals are commonly identified by detecting their characteristic open surface state Fermi arcs in angle-resolved photoemission (ARPES) experiments. However, in type-II Weyl semimetals the Fermi arcs generally disappear in the bulk carrier pockets before reaching the Weyl points where they terminate - making it harder to unambiguously identify this new electronic state. Using laser-based ARPES, we have resolved multiple distinct Fermi arcs on the inequivalent top and bottom (001) surfaces of the candidate type-II Weyl semimetal $MoTe_2$. By comparing our ARPES data with systematic electronic structure calculations simulating different Weyl point arrangements, we show that some of these arcs are false positives as they can be explained without Weyl points, while others are only reproduced in scenarios with at least eight Weyl points. Our results thus suggest that $MoTe_2$ is the first experimental realisation of a type-II Weyl semimetal.

Anna Tamai
DQMP, University of Geneva

Date submitted: 10 Nov 2016 Electronic form version 1.4