

O 91: Overview Talk: Phil King

Time: Friday 9:30–10:15

Location: H15

Invited Talk

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Controlling and imaging electronic structures of Quantum Materials — ●PHIL KING — University of St Andrews, UK

In quantum materials, strong many-particle interactions can drive a host of novel states and phases to emerge. Their collective nature, however, renders understanding, let alone controlling, the behaviour of their electrons a formidable challenge. Angle-resolved photoemission, as a momentum-resolved probe of the occupied part of the single-particle spectral function, can provide enormous insight: not only on the electronic band structures of quantum materials, but also the ef-

fects of interactions, and the opening of many-body gaps in the excitation spectrum that result from these interactions. I will illustrate how this can be used to gain new insights on controlling quantum many-body states in solids and at their surfaces. Examples include engineering magnetic instabilities [1], stabilising unexpectedly large Rashba-like spin-orbit splittings [2], strain tuning of Fermi surface topology, controlling charge-ordered states in single-layer materials [3], and studying the interplay of correlated and itinerant electrons [4].

[1] Mazzola et al., PNAS in press (arXiv:1710.05392) [2] Sunko et al., Nature 549 (2017) 492 [3] Feng et al., Nano. Lett. 18 (2018) 4493 [4] Sunko et al., arXiv:1809.08972