Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2866** Type: **Invited Speaker / Conférencier(ère) invité(e)**

Connecting Superconductivity and Quantum Criticality with the High-Field Hall Effect in a Strange Metal

Tuesday 4 June 2019 16:15 (30 minutes)

Unconventional superconductivity, and high–Tc superconductivity in particular, remains one of the most distinctively intractable prob- lems in physics. The existence of a common phenomenology which links these materials into a class known as "strange metals, provides hope that there is unifying theory that describes them. In this letter, we show that the Hall effect of the unconventional superconductor BaFe2(As1–xPx)2contains an anomalous contri- bution arising from the correlations within the strange metal. By leveraging the dependence of the Hall coefficient at high magnetic fields we are able to map the evolution of the strange metal, giving a quantitative measure of the correlated contribution in a manner that is not possible from studying the temperature dependence alone. In this way we can show that superconductivity is connected to the zero temperature physics of the strange metal phenomenology, and that the this strange metallic behavior must arise from fluctuations of a nearby quantum critical point. These observations create a clear but unexpected picture of strange metals that reframes our understanding of the relationship between strong correlations, quantum phase transitions and superconductivity.

Author: Prof. ANALYTIS, James (University of California, Berkeley)

Presenter: Prof. ANALYTIS, James (University of California, Berkeley)

Session Classification: T4-5 Topological materials (DCMMP) | Matériaux topologiques (DPMCM)

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)