

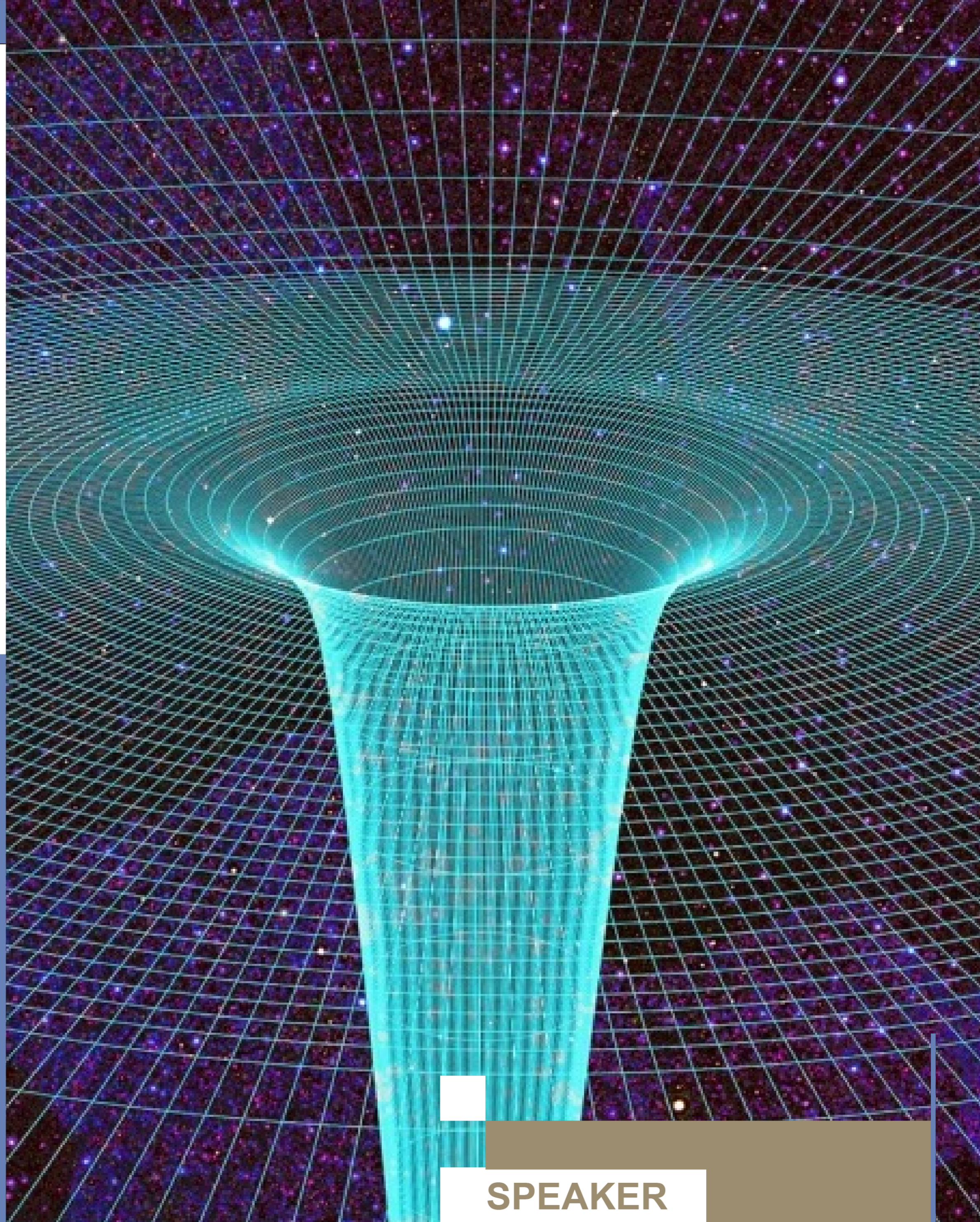


Department of Physics
The University of Hong Kong



HONG KONG COMPUTATIONAL
and THEORETICAL PHYSICS
STUDY GROUP 2023

Universal theory of strange metals



SPEAKER

ABSTRACT

Strange metals are ubiquitous in correlated quantum materials. In limit of low temperatures (T), strange metals are characterized by a low resistivity which decreases linearly with T to values well below the Mott-Ioffe-Regel bound, a specific heat which varies as $T \ln(1/T)$, and a marginal Fermi liquid form for the electronic spectrum. We present a theory of strange metals in two dimensions which reproduces all of these features, and is also in general agreement with the frequency and T dependence of optical conductivity measurements in the hole-doped cuprates. The theory describes a Fermi surface coupled to a critical boson, the latter representing an order parameter or an emergent gauge field. We find that the key ingredient in the strange metal behavior is the presence of spatial randomness in the Yukawa coupling between fermions and the critical boson. Our solution builds on insights gained from the exactly soluble Yukawa-Sachdev-Ye-Kitaev models of metals without quasiparticles.



**Professor
Subir Sachdev**

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Registration



Time: March 16, 2023 (Thursday) 16:30-18:30
Venue: CPD - 3.29 (Central Podium Levels)
Moderator: Prof. Zi Yang Meng (Department of Physics,
Faculty of Sciences, The University of Hong Kong)
Zoom: <https://hku.zoom.us/j/6510731643>
Meeting ID: 651 073 1643 Password: 786060
Enquiry: xxran@connect.hku.hk zhengyan@hku.hk