**Speaker:**

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**Title:**

Latest EELS results on plasmons and the MFL-like continuum in strange metals

**Abstract:**

Strange metals exhibit a T-linear resistivity that many authors interpret as a signature of Planckian dissipation. A key feature of strange metals is the marginal Fermi liquid (MFL) phenomenology wherein the polarizability is hypothesized to exhibit an omega/T form for omega<T and a constant form omega>T. We previously observed this constant region at large momentum, q, in momentum-resolved EELS (M-EELS) measurements of the strange metal phase of Bi-2212 [1,2]. However, the omega/T region was not observed, and it has been difficult to reconcile these results with the well-known 1 eV plasmon observed at q=0 in IR experiments.

In this talk I will present new results with improved momentum resolution showing, for q < 0.03 r.l.u., a plasmon with the same 1 eV energy and width as observed in IR measurements. For q > 0.03 r.l.u., this plasmon decays into an MFL-like continuum. I will also show first measurements of the omega/T region in which the susceptibility is consistent with predictions from a dual 0+1 dimensional CFT with a conformal dimension of delta ~ 0.03 *. This dimension is quite far from the nominal MFL value of \delta=0.5 and suggest the data might be consistent with a holographic CFT with a non-MFL form.

* Thanks to Tom Faulkner for detailed discussions.

[1] M. Mitrano et al., Proc. Natl. Acad. Sci. U.S.A. 115, 5392 (2018)

[2] A. Husain et al., Phys. Rev. X 9, 041062 (2019)

[3] T. Faulkner et al., JHEP 2011, 51 (2011)