TEP Seminar

Tuesday, March 17th @ 2pm
Schwinger Lounge

UCLA

"Revisiting Schrodinger CFTs"

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Abstract: Schrodinger CFTs describe non-relativistic fixed points with dynamical critical exponent $z=2$; including the BCS-BEC crossover, heavy atoms in a harmonic trap, nuclear physics EFTs, stochastic/Langevin systems, and null-reductions of Lorentzian CFTs, to name a few examples. Given their broad experimental relevance, they also make an excellent target for the conformal bootstrap and study of generalized symmetries.

I will start with an elementary introduction to Schrodinger CFTs and their stunningly accurate predictions for energy levels of fermion bound states in a harmonic trap. Then I will discuss a number of longstanding conceptual mysteries in the subject, including the state-operator correspondence, existence of massless particles, and various non-renormalization theorems. By making a careful analogy to Lorentzian CFTs and thermofield doubles, I will define the "harmonic trap geometry," analogous to the conformal cylinder in usual CFT. Using this, I will provide a resolution to the aforementioned issues. Time permitting, I will comment on unitarity bounds and implications for non-relativistic holography and the bootstrap.