

Tuesday, May 5th @ 2pm

Schwinger Lounge

Hosted by Prof. Thomas Dumitrescu

“No Shift, Sherlock: No Shift Symmetries in AdS/CFT”

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Abstract: The absence of global symmetries is a long-standing conjecture about quantum gravity. In this talk, I will focus on continuous global shift symmetries in AdS/CFT, with the goal of developing a CFT-based argument against them. First, I will discuss how a shift symmetry in the bulk is reflected on the boundary CFT. This will lead to the question of whether a local, unitary CFT can have a conformal manifold direction along which nothing changes. I will present an argument that, under certain assumption, rules out this possibility. Then, I will introduce some CFTs that do not satisfy this assumption and suggest that this leads to an exotic type of shift symmetry gauging in the bulk. A key role will be played by the CFT stress tensor, which is dual to the graviton in the bulk. To see how theories without gravity avoid the argument, I will describe how it fails in the boundary theory of a massless free scalar in AdS, namely the generalized free field theory of a marginal operator. Finally, if time permits, I will address whether this type of argument could lead to a bound on how much the shift symmetry must be broken.