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No Shift, Sherlock

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In this talk, I will present a novel CFT-based argument against continuous shift symmetries in AdS/CFT. Unlike other global symmetries, continuous scalar shift symmetries have a clear CFT counterpart: the existence of a conformal manifold along which the CFT data does not change. This allows us to ask whether a local and unitary CFT can exhibit such a property. We provide a purely CFT argument against this possibility. To clarify the role of locality on the CFT (or equivalently, having quantum gravity in the bulk), we also describe how this property is realized in the dual theory of a massless free scalar in rigid AdS, namely the generalized free field theory of a marginal operator. Crucially, this realization of the shift symmetry relies on the boundary theory being non-local.

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