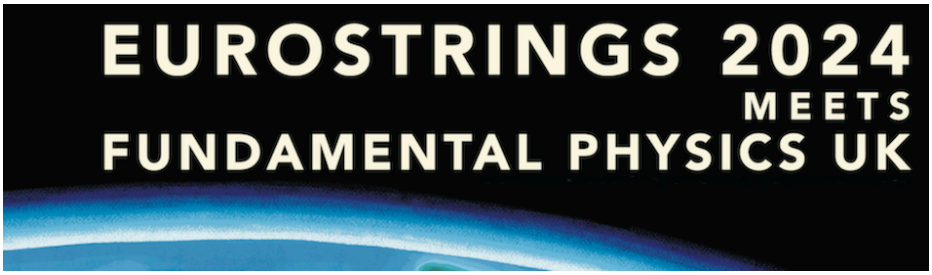

Contribution ID: **31** Type: **Talk in parallel session**

Black Hole Singularity from OPE

Tuesday 3 September 2024 15:10 (20 minutes)

Eternal asymptotically AdS black holes are dual to thermofield double states in the boundary CFT. It has long been known that black hole singularities have certain signatures in boundary thermal two-point functions related to null geodesics bouncing off the singularities (bouncing geodesics). In this talk I will discuss the manifestations of black hole singularities in the dual CFT.

By decomposing the boundary CFT correlator of scalar operators using the Operator Product Expansion (OPE) and focusing on the contributions from the identity, the stress tensor, and its products, I will show that this part of the correlator develops singularities precisely at the points that are connected by bulk bouncing geodesics. Black hole singularities are thus encoded in the analytic behavior of the boundary correlators determined by multiple stress tensor exchanges. Furthermore, I will show that in the limit where the conformal dimension of the operators is large, the sum of multi-stress-tensor contributions develops a branch point singularity as predicted by the geodesic analysis. I will then argue that the appearance of complexified geodesics, which play an important role in computing the full correlator, is related to the contributions of the double-trace operators in the boundary CFT.

Link to publication (if applicable)

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Session Classification: Parallel sessions

Track Classification: Holography (applied) 1