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Hidden Conformal Symmetries from Killing Tensors

Monday, November 22, 2021 3:50 PM (20 minutes)

I will discuss the recent paper 2110.10723, in which we generalize the notion of hidden conformal symmetry in Kerr/CFT to Kerr- (A)dS black holes in arbitrary dimensions. We build the $SL(2, \mathbb{R})$ generators directly from the Killing tower, whose Killing tensors and Killing vectors enforce the separability of the equations of motion. Our construction amounts to an explicit relationship between hidden conformal symmetries and Killing tensors: we use the Killing tower to build a novel tensor equation connecting the $SL(2, \mathbb{R})$ Casimir with the radial Klein-Gordon operator. For asymptotically flat black holes in four and five dimensions we recover previously known results that were obtained using the "near-region" limit and the monodromy method. We then perform a monodromy evaluation of the Klein-Gordon scalar wave equation for all Kerr-(A)dS black holes, finding explicit forms for the zero mode symmetry generators. We also extend this analysis to the large-dimensional Schwarzschild black hole as a step towards building a Large-D/CFT correspondence.

Primary authors: Dr PRIYA, Alankrita (Arizona State University); Prof. KEELER, Cynthia (Arizona State University); MARTIN, Victoria (University of Iceland)

Presenter: MARTIN, Victoria (University of Iceland)