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Generalized Fefferman-Graham gauge and boundary Weyl structures

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In the framework of the AdS/CFT correspondence, the Fefferman-Graham (FG) gauge offers a useful way to express asymptotically anti-de Sitter spaces, allowing a clear identification of their boundary structure. Although, it is well-known that in holographic theories bulk diffeomorphisms imply Weyl invariance of the dual field theory, choosing a conformal representative for the boundary metric in the FG gauge breaks explicitly this symmetry. Recent developments have shown that it is possible to generalize the FG gauge to restore boundary Weyl invariance. In this talk, we focus on three-dimensional AdS gravity and explore the implications of a boundary Weyl structure by utilizing the generalized Fefferman-Graham (gFG) frame introduced by Grumiller and Riegler in 2016. By extending the holographic renormalization scheme to incorporate Weyl covariant quantities, we construct the quantum-generating functional, extract the holographic stress tensor, compute the Weyl anomaly, and introduce a novel holographic current associated with the boundary Weyl connection. We will briefly comment on an explicit application of this formalism to accelerating black holes.

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