

Black holes from singlet models (Nico Wintergerst, Niels Bohr Institute, Univ. of Copenhagen)

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Thermal boundary correlation functions provide a direct and accessible way to probe features of an emergent bulk geometry. In free large N gauge theories dual to higher spin gravity and tensionless string theory, two point correlators of singlet operators encode propagation through an approximate AdS spacetime at low temperatures. Contrarily, in high temperature phases, we discover characteristic signatures of bulk black holes. This includes the existence of evanescent modes and the exponential decay of time dependent correlations, as well as significant departure of spatial correlators from their bulk thermal AdS form. Surprisingly, correlators reveal in addition the emergence of a new scale beyond which they recover their thermal AdS structure up to an overall temperature dependent normalization. This finite volume effect is most prominently seen in the $O(N)/U(N)$ vector model in 2+1 dimensions, dual to 3+1-dimensional Vasiliev higher spin gauge theory.

Summary