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# Holographic Thermal Correlators for Hyperbolic CFTs

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We use holography to compute the exact form of retarded Green's functions for a scalar operator with conformal dimension $\Delta$ in a thermal CFT and in its related counterpart with chemical potential in $R^1 \times H^3$. In our analysis, we recast the wave equation of a scalar field in the normal form of Heun's equation in the dual gravity theories described by the AdS hyperbolic blackhole and its charged version. Heun's equation is identified to the semiclassical limit of the BPZ equation for a five-point correlator with one degenerate field insertion in the Liouville theory on the Riemann sphere. The crossing symmetry of conformal block in the Liouville theory eventually gives rise to a set of connection formulas among the solutions of Heun's equation evaluated at different regular singularities. We use the connection formula to reproduce the leading order behaviors of the scalar field near the horizon as well as near the boundary and achieve the exact form of the retarded thermal Green's function. We show a recipe to obtain the exact retarded Green's function for a thermal CFT dual to AdS blackbrane from a high-temperature limit accompanied by a complex mapping on AdS hyperbolic blackhole. Moreover, we show the retarded Green's function for the boundary CFT of Rindler AdS spacetime admits a free integer parameter.

**Authors:** MAURYA, Arpit (IIT Ropar); Dr BHATTA, Atanu; Dr CHAKRABORTTY, Shankhadeep (IIT Ropar); Dr MANDAL, Taniya

**Presenter:** MAURYA, Arpit (IIT Ropar)