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Thermal properties of quantum fields near spherically symmetric apparent horizon and Black Hole thermodynamics.

Abstract:
In this talk we discuss the form of the correlation functions of a quantum scalar field near the apparent horizon of a spherically symmetric dynamical Black Hole.
We show that if the quantum state is of Hadamard form, when a suitable scaling procedure towards the horizon is considered, a thermal spectrum along the integral lines of the Kodama vector fields can be detected.
The temperature seen in this spectrum depends on the particular point of the apparent horizon towards which the scaling is performed thus allowing to analyze temperature changes along the apparent horizon itself.
This evolution is compatible with the thermodynamic law of Black Hole dynamics.
Furthermore, since this effect does not depend on the particular form of the chosen quantum state, it is shown to be universal.