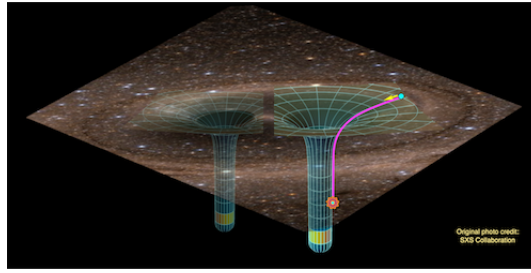


## Black-Hole Microstructure V



ID de Contribution: 13

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# The universality of black hole thermodynamics

*mercredi 7 juin 2023 14:00 (1 heure)*

Abstract: The thermodynamic properties of black holes – temperature, entropy and radiation rates – are usually associated with the presence of a horizon. We argue that any Extremely Compact Object (ECO) must have the *{it same}* thermodynamic properties. Quantum fields just outside the surface of an ECO have a large negative Casimir energy similar to the Boulware vacuum of black holes. If the thermal radiation emanating from the ECO does not fill the near-surface region at the local Unruh temperature, then we find that no solution of gravity equations is possible. In string theory, black holes microstates are horizonless quantum objects called fuzzballs that are expected to have a surface  $\sim l_p$  outside  $r = 2GM$ ; thus the information puzzle is resolved while preserving the semiclassical thermodynamics of black holes.

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