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Thermodynamics of scalar-tensor gravity

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In the 90s it was shown that the Einstein equation could be understood as an equation of state, general relativity as the equilibrium state of gravity, and f(R) gravity as a non-equilibrium one. In this presentation I discuss how the application of Eckart's first order thermodynamics to the effective dissipative fluid describing scalar-tensor gravity leads to a thermodynamics for the space of theories of gravity. Surprisingly, within this picture one obtains simple expressions for the effective heat flux, "temperature of gravity", shear and bulk viscosity, and entropy density, plus a generalized Fourier law in a consistent Eckart thermodynamical picture. Furthermore, a well-defined notion of the approach to equilibrium, missing in the current thermodynamics of spacetime scenarios, naturally emerges.

Author: GIUSTI, Andrea (ETH Zürich)

Co-author: Prof. FARAONI, Valerio (Bishop's University)

Presenter: GIUSTI, Andrea (ETH Zürich)

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