## Phenomenology 2025 Symposium



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## A lapse-Wick rotation on curved backgrounds: admissible complex metrics and the generalized heat kernel

Monday 19 May 2025 14:30 (15 minutes)

On generic (non-stationary) curved backgrounds, the link between Euclidean and Lorentzian signature QFT via a Wick rotation is not fully understood. In this talk, I will present a generalization to curved spacetimes of a variant of Wick rotation originally due to Zimmermann. This construction interpolates between Lorentzian and Riemannian metrics on the same underlying smooth real manifold, passing through admissible complex metrics dampening the exponential of the action of a real scalar field. Next, motivated by the central role of the heat kernel in both one-loop perturbation theory and non-perturbative functional renormalization group methods in Euclidean QFT, I will briefly discuss the generalized heat semigroup and kernel associated to the Wick rotated metric, as well as the strict Lorentzian limit. This talk is based on joint work with Max Niedermaier, appearing in the papers: Class.Quant.Grav. 42 (2025) and J.Funct.Anal. 289 (2025).

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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