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Signature change in loop quantum cosmology

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The Wick rotation is commonly considered only as an useful computational trick. However, as it was suggested by Hartle and Hawking already in early eighties, Wick rotation may gain physical meaning at the Planck epoch. While such possibility is conceptually interesting, leading to no-boundary proposal, mechanism behind the signature change remains mysterious.
In this talk we show that the signature change anticipated by Hartle and Hawking may occur in result of the loop quantum gravity effects. Theory of cosmological perturbations with the effects of quantum holonomies is constructed. It is shown that such theory can be uniquely formulated in the anomaly-free manner. The algebra of quantum constraints turns out to be modified such that the signature is changing from Lorentzian in low curvature regime to Euclidean in high curvature regime. Implications of this phenomenon on propagation of cosmological perturbations are discussed. Possible relations with other approaches to quantum gravity are also outlined.