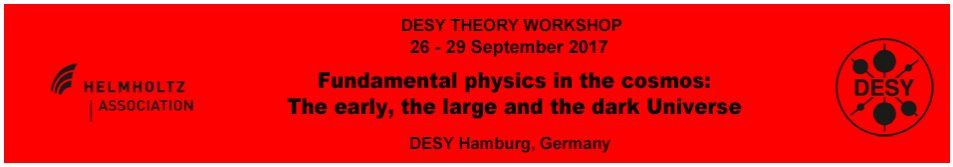

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Quantum Transitions through Cosmological Singularities

Thursday 28 September 2017 14:20 (20 minutes)

We study quantum mechanical tunneling using complex solutions of the classical field equations. Simple visualization techniques allow us to unify and generalize previous treatments, and straightforwardly show the connection to the standard approach using Euclidean instanton solutions. Applying these techniques to quantum cosmology we describe transitions between classical patches of the configuration space on which the universe's quantum state is defined.
In particular we calculate the quantum transition, in the saddle point approximation connecting asymptotically classical, inflating as well as ekpyrotic histories. This supplies probabilities for how a classical history on one side transitions and branches into a range of classical histories on the opposite side. We find a small quantum probability to bounce even when the classical extrapolation of the incoming history is singular.

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