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Keeping matter in the loop in dS_3 quantum gravity

Wednesday 19 April 2023 10:00 (1 hour)

In this talk I will discuss a novel mechanism that couples matter fields to three-dimensional de Sitter quantum gravity. This construction is based on the Chern-Simons formulation of three-dimensional Euclidean gravity, and it centers on a collection of Wilson loops winding around Euclidean de Sitter space. We coin this object a Wilson spool. To construct the spool, we build novel representations of su(2). To evaluate the spool, we adapt and exploit several known exact results in Chern-Simons theory. Our proposal correctly reproduces the one-loop determinant of a free massive scalar field on S^3 as G_N->0. Moreover, allowing for quantum metric fluctuations, it can be systematically evaluated to any order in perturbation theory.

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