

Quantum field theory meets gravity



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Quantum Gravity from Timelike Liouville

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The Euclidean path integral of quantum gravity requires a proper definition because the kinetic term for the conformal factor of the metric comes with an additional minus sign. We propose a definition of two-dimensional quantum gravity with a cosmological constant based on the conformal bootstrap results of time-like Liouville theory coupled to matter. For the spectrum, we prove a no-ghost theorem for the states in the BRST cohomology. We then show that the crossing symmetric 4-point function constructed by gluing the timelike 3-point function with the Ribault-Santachiara contour for internal momenta, is well-defined when the external momenta are analytically continued to correspond to the physical states in the BRST cohomology.

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