

Causal Dynamical Triangulations: Creating Quantum Spacetime Dynamically

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The search for quantum spacetime - the putative quantum description of spacetime at Planckian scales - can be approached in many ways, from semiheuristic mathematical modelling to fully-fledged nonperturbative systems of quantum gravity. My colloquium talk will introduce Causal Dynamical Triangulations (CDT), a nonperturbative path integral method for constructing a fundamental theory of quantum gravity, including its motivation, ingredients and computational implementation. I will then give an overview of old and new results obtained in CDT quantum gravity, including the statistical model's phase structure, the emergence of semiclassical geometry and counterintuitive properties found on short length scales, and what they may tell us about the nature of quantum spacetime and nonperturbative formulations of quantum gravity in general.