Complex critical points and curved geometries in four-dimensional Lorentzian spinfoam quantum gravity

The flatness problem has been a key open problem in Loop quantum gravity for more than a decade. These curved geometries in spinfoam theory have been overlooked because they correspond to complex critical points. But they can be revealed by a more refined stationary phase analysis involving the analytic continuation of the spinfoam integrand. We will show the curved Regge geometry indeed gives the dominant contribution to the spinfoam amplitude by using the numerical results based on the Delta_3 triangulation and the Pachner move triangulation.