Abstract

We set the foundation for a series of works aimed at proving strong relations between uniform random planar maps and Liouville quantum gravity (LQG). Our method relies on a bijective encoding of site-percolated planar triangulations by certain 2D lattice paths. Our bijection parallels in the discrete setting the *mating-of-trees* framework of LQG and Schramm-Loewner evolutions (SLE) introduced by Duplantier, Miller, and Sheffield. Combining these two correspondences allows us to relate uniform site-percolated triangulations to $\sqrt{8/3}$-LQG and SLE_6. In particular, we establish the convergence of several functionals of the percolation model to continuous random objects defined in terms of $\sqrt{8/3}$-LQG and SLE_6. For instance, we show that the exploration tree of the percolation converges to a branching SLE_6, and that the collection of percolation cycles converges to the conformal loop ensemble CLE_6. We also prove convergence of counting measure on the pivotal points of the percolation. Our results play an essential role in several other works, including a program for showing convergence of the conformal structure of uniform triangulations and works which study the behavior of random walk on the uniform infinite planar triangulation.