Seminar/Talk

The intrinsic metric and the random walk on 2D critical percolation and CLE

Yizheng Yuan
University of Vienna

Host: Laszlo Erdös & Jan Maas

Intrinsic metrics (a.k.a. chemical distance) and random walks on percolation models have been attracting a lot of mathematical attention. The case of (low-dimensional) critical percolation, however, has remained poorly understood. Despite the significant progress in understanding the large-scale geometry and scaling limits of 2D critical percolation (thanks to the works of Schramm, Smirnov, and others), the metric properties are not captured by these results.In this talk, I will explain how to construct the scaling limits of the intrinsic metric and the random walk on 2D critical percolation clusters. The scaling limit of the clusters as sets belongs to a class of random fractals called the conformal loop ensemble (CLE) gaskets. In our work, we construct for each CLE_\kappa, \kappa \in]4,8[, the canonical shortest-path metric and the canonical Brownian motion on its gasket. We show that there exists a geodesic metric (resp. diffusion process) on the CLE gasket that is uniquely determined by its local geometry. For \kappa=6, we show that it is the scaling limit of the chemical distance metric (resp. the random walk) on critical percolation. (For the other values of \kappa, they are the conjectural scaling limits of FK and loop O(n) models.)This talk is based on joint works with Valeria Ambrosio, Irina ankovi, Maarten Markering, and Jason Miller.

Monday, January 12, 2026 05:00pm - 06:00pm
Central Bldg / O1 / Mondi 2a (I01.O1.008)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.