Rotational invariance of the critical planar FK-percolation model

Ioan Manolescu (Université de Fribourg)

Host: M. Beiglböck, N. Berestycki, L. Erdös, J. Maas, F. Toninelli

We prove the asymptotic rotational invariance of the critical FK-percolation model on the square lattice with any cluster-weight between 1 and 4. These models are expected to exhibit conformally invariant scaling limits that depend on the cluster weight, thus covering a continuum of universality classes. The rotation invariance of the scaling limit is a strong indication of the wider conformal invariance, and may indeed serve as a stepping stone to the latter.

Our result is obtained via a universality theorem for FK-percolation on certain isoradial lattices. This in turn is proved via the star-triangle (or Yang-Baxter) transformation, which may be used to gradually change the square lattice into any of these isoradial lattices, while preserving certain features of the model. It was previously proved that throughout this transformation, the large scale geometry of the model is distorted by at most a limited amount. In the present work we argue that the distortion becomes insignificant as the scale increases. This hinges on the interplay between the inhomogeneity of isoradial models and their embeddings, which compensate each other at large scales. As a byproduct, we obtain the asymptotic rotational invariance also for models related to FK-percolation, such as the Potts and six-vertex ones. Moreover, the approach described here is fairly generic and may be adapted to other systems which possess a Yang-Baxter transformation.

Based on joint work with Hugo Duminil-Copin, Karol Kajetan Kozlowski, Dmitry Krachun and Mendes Oulamara.

Tuesday, March 9, 2021 04:30pm - 05:15pm
IST Austria Campus Online via Zoom

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