



colmeia

# Colóquio Interinstitucional

## Modelos Estocásticos e Aplicações

Quinta-feira, 6 de fevereiro de 2020

### Programa

14:00 - 15:20 – **Franco Severo (IHÉS)**

Large deviation results for percolation of Gaussian Free Field level-sets

We consider the Gaussian Free Field (GFF) on  $\mathbb{Z}^d$ , for  $d \geq 3$ , and its level-sets above a given height  $h \in \mathbb{R}$ . As  $h$  varies, this defines a natural percolation model with slow decay of correlations. This model, first studied in the 80s by Bricmont, Lebowitz and Maes, became a subject of intense research over the last decade due to developments on renormalization theory. In this talk we shall discuss some of these developments, with special emphasis on large deviation results for percolation events. We will explain how the so called “entropic repulsion phenomenon”, first observed by Bolthausen, Deuschel and Zeitouni, allows one to prove large deviation results for the GFF level-sets which are not even available for independent percolation. This exemplifies how more correlations sometimes can make things more treatable.

[Based on joint works with S. Goswami, A. Prévost and P-F. Rodriguez]

15:40 - 17:00 – **Daniel Ahlberg (Stockholm University)**

*Geodesics in first-passage percolation*

In first-passage percolation the edges of the square lattice are equipped with iid non-negative random weights. The weighted graph induces a metric on  $\mathbb{Z}^2$ , in which the distance between two points corresponds to the minimal weight-sum of a path connecting the points. In the mid 1990s Chuck Newman posed a series of conjectures regarding infinite geodesics in this random metric space, and proved these under an additional condition that remains unverified to this day. Later work has aimed to make rigorous progress on these conjectures, e.g. via the study of coexistence in a model for competing growth. In this talk we shall review parts of this history, and describe versions of Newman’s conjectures which we may prove. Finally, as an application of these results we prove two corollaries: First we make precise the relation between geodesics and coexistence in the competing growth model, and second we resolve the “midpoint problem” posed by Benjamini, Kalai and Schramm.

[Based on joint work with C. Hoffman]

17:00 – Discussão e pizza!

### Local

Sala de reuniões do Decanato do CTC  
12<sup>o</sup> andar do prédio Cardeal Leme  
PUC-Rio, Gávea

### Contatos

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Realização:



Apoio:



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