

# Séminaire de Probabilités et Statistique

**Mardi 10 mars à 14h00**

Laboratoire Dieudonné  
Salle de conférence - LJAD

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## *Two-sample Hypothesis Testing for Inhomogeneous Random Graphs*

The study of networks leads to a wide range of high-dimensional inference problems. In many practical applications, one needs to draw inference from one or few large sparse networks. In this talk, we discuss hypothesis testing of graphs in this high-dimensional regime, where the goal is to test between two populations of random graphs. The size of each population is much smaller than graph size, and can even be a constant as small as 1. The critical question in this context is whether the problem is solvable for small sample size.

We answer this question from a minimax testing perspective. We assume the graphs to be generated from inhomogeneous Erdős-Rényi models, and derive minimax separation rates for the two-sample problem given a fixed sample size  $m$ . We observe that if  $m$  is small, then the problem cannot be solved using some popular approaches. However, if the problem is formulated correctly, then one can derive adaptive near-optimal two-sample tests.

This work was done in collaboration with Maurilio Gutzeit, Alexandra Carpentier, and Ulrike von Luxburg.