

# SEMPARIS – Séminaires en région parisienne

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## Forum de Physique Statistique @ ENS

**Mercredi 5 Février 2025, 12 :45**

LPENS, 3 rue d'Ulm, Collège de France

Domaines : cond-mat.stat-mech

Titre : *Rényi complexity in mean-field disordered systems*

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Résumé : *Configurational entropy, or complexity, plays a critical role in characterizing disordered systems such as glasses. Yet its measurement often requires significant computational resources. Recently, Rényi entropy, a one-parameter generalization of the Shannon entropy, has gained attention across various fields of physics due to its simpler functional form, making it more practical for measurements. I will explain that the Rényi complexity corresponds, in disordered models, to a generalized Franz-Parisi potential, namely the difference of the free energy of a cloned system and the original one. I will detail the case of the mean-field  $p$ -spin spherical model, where the computation of Rényi complexities can be performed analytically via the replica trick. the Rényi complexities vanish at the Kauzmann temperature  $T_k$ , suggesting that they are a useful observable for estimating  $T_k$  in practical applications. Moreover, we show that RSB solutions are required even in the liquid phase, where interesting relationships are found between Rényi complexities and the annealed Franz-Parisi potential.*

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