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Forum de Physique Statistique @ ENS

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Titre : *Renyi 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, Renyi 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 Renyi 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 Renyi complexities vanish at the Kauzmann temperature Tk, suggesting that they are a useful observable for estimating Tk in practical applications. Moreover, we show that RSB solutions are required even in the liquid phase, where interesting relationships are found between Renyi complexities and the annealed Franz-Parisi potential.*
