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Forum de Physique Statistique @ ENS

Mercredi 7 Mai 2025, 12 :30
LPENS, 3 rue dUlm (College de France)
Domaines : cond-mat.stat-mech

Titre : *An exact solution of the macroscopic fluctuation theory for symmetric exclusion*

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Résumé : *Gianni Jona-Lasinio and his collaborators have proposed in the early 2000's a non-linear action functional that encodes the macroscopic fluctuations and the large deviations for a wide class of diffusive systems out of equilibrium. In this Macroscopic Fluctuation Theory (MFT), optimal fluctuations far from equilibrium can be found, at a coarse-grained scale, by solving two coupled non-linear hydrodynamic equations.*

In this talk, we shall show that the MFT equations for the symmetric exclusion process are classically integrable and can be solved with the help of the inverse scattering method, originally developed to study solitons in the KdV or the NLS equations. This exact solution will allow us to calculate the large deviations of the current and the optimal profiles that generates a given fluctuation, both at initial and final times. This macroscopic solution matches previous results that were derived, by applying the Bethe Ansatz, at the microscopic level.