Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Fluctuations of one-dimensional interface in the directed polymer formulation: role of a finite interface width[1] ELISABETH AGORITSAS, DPMC-MaNEP, University of Geneva (Switzerland), VIVIEN LECOMTE, Laboratoire Probabilite et Modeles Aleatoires, Universities Paris VI and Paris VII (France), THIERRY GIAMARCHI, DPMC-MaNEP, University of Geneva (Switzerland) — An elastic interface living in a disordered medium always exhibits geometrical fluctuations, characterized in particular by the distribution of its relative displacements as a function of the lengthscale r, whose variance defines the interface roughness $B(r)$. Those fluctuations are the manifestation of the probability and associated effective free-energy of the different configurations of the interface, in presence of disorder and at finite temperature. Focusing specifically on the one-dimensional interface, we use the exact mapping of the static interface on the directed polymer in random medium in order to explore both analytically and numerically the role of a finite interface width $\xi > 0$, assuming a short-range elasticity and a random-bond quenched disorder. Confirming the existence of a low-temperature regime where the finite microscopic width plays a crucial role, as predicted by previous Gaussian-Variational-Method predictions [Phys.Rev.B 82, 184207 (2010)], we propose a coherent picture of the physics at stake, compatible both with numerical computations and generic scaling arguments.

[1]This work was supported in part by the Swiss SNF under MaNEP and Division II.

Elisabeth Agoritsas
DPMC-MaNEP, University of Geneva (Switzerland)

Date submitted: 11 Nov 2011 Electronic form version 1.4