ATELIER « FONCTIONS ALÉATOIRES, SURFACES ALÉATOIRES ET INTERFACES »
4–9 JANVIER 2009

WORKSHOP "RANDOM FUNCTIONS, RANDOM SURFACES AND INTERFACES"
JANUARY 04–09, 2009

On distribution of surface extrema in several one- and two-dimensional random landscapes and statistics of permutations

SERGEI NECHAEV

Division de Physique Théorique
Institut de Physique Nucléaire
91406 Orsay Cedex
FRANCE

sergei.nechaev@gmail.com

We consider the problems which can be analyzed using the image of a sequential ballistic deposition in a finite box. We analyze the structure of enveloping surface in $1+1$ and in $2+1$ dimensions and calculate the distribution function of number of local "peaks" of such a surface. Our computation uses two facts : (a) the uniform one-dimensional ballistic growth process in the steady state can be formulated in terms of "rise-and-descent" patterns in the ensemble of random permutation matrices, and (b) the statistics of "rises" and"descents" in random permutations can be described in terms of a certain continuous-space Hammersley-type process. Some application to growth of objects with braid-like topology in 1+1- and in 2+1 dimensions are also described.