Relaxation phenomena during non-equilibrium growth

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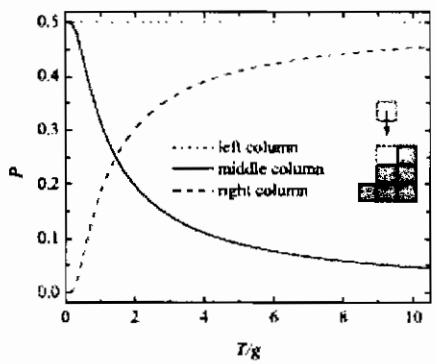

Figure 1. Probabilities that for the shown configuration the particle, initially deposited on top of the middle column, comes to rest on top of one of the three columns.

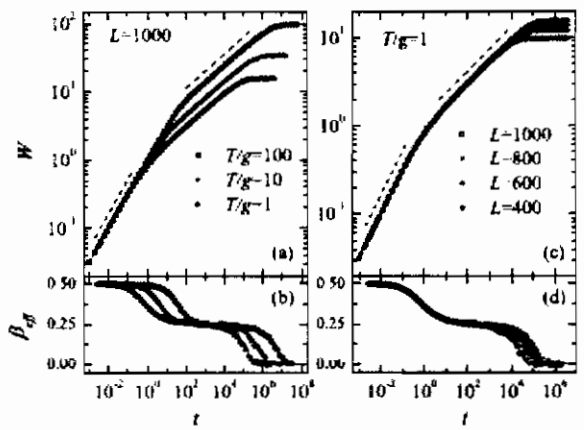

Figure 2. (a) Log log plot of the surface width versus time for a system of size L 1000 and different values of T/q. The dashed lines have the slopes 1/2 and 1/4 expected in the random deposition and EW regimes, respectively. The location of both crossover points depend on temperature. The full lines are obtained from fitting the exact solution of the EW stochastic equation. Here and in the following error bars are smaller than the symbol sizes. (b) Time evolution of the effective exponent (3) for the data shown in (a). (c) Log log plot of the surface width versus time for systems of different sizes evolving at the value T/q 1. (d) Time evolution of the effective exponent (3) for the data shown in (c). The full lines are derived from the fits to the exact solution of the EW stochastic equation.

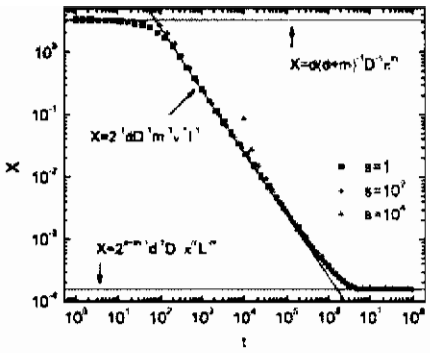

Figure 4. The global fluctuation-dissipation ratio for the one-dimensional EW case, with $m = 1$. The ratio (51) displays a different behaviour in the different regimes. The data have been obtained by numerically evaluating the exact expressions derived in the previous subsections. The parameters are $L = 500$, $D = 1$, and $\nu = 0.001$

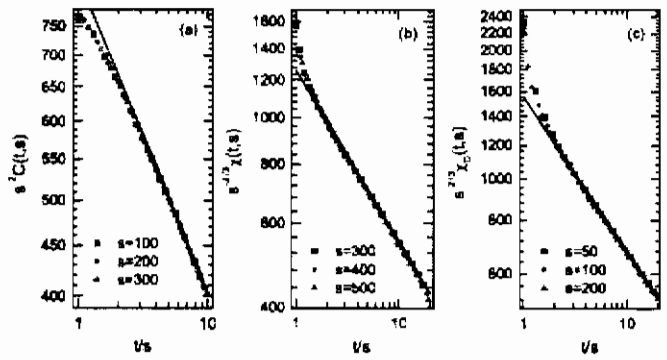

Figure 5. Log-log plots of global quantities as a function of t/s obtained from the one-dimensional KPZ equation in the correlated regime: (a) global correlation (b) global response to a change of the surface tension ν, and (c) global response to a change of the noise strength D. The data in (a) and (c) have been obtained with the Newman algorithm [60, 65], whereas the data in (b) result from the algorithm of Lam and Shin. We checked that both algorithms produce the same exponents and scaling functions for a given quantity. The system size is $L = 10000$, with $\lambda = 1$, $\nu = 1$, and $D = 1$. For the response shown in (b), ν has the value of 1.1 until time s, at which point it is changed to the value 1, whereas for (c) D was changed from the value 1.1 to 1 at time s. The data shown have been obtained after averaging over 5×10^6 realizations for the correlation and 5×10^5 realizations for the response. The lines indicate the asymptotic power-law behaviour.

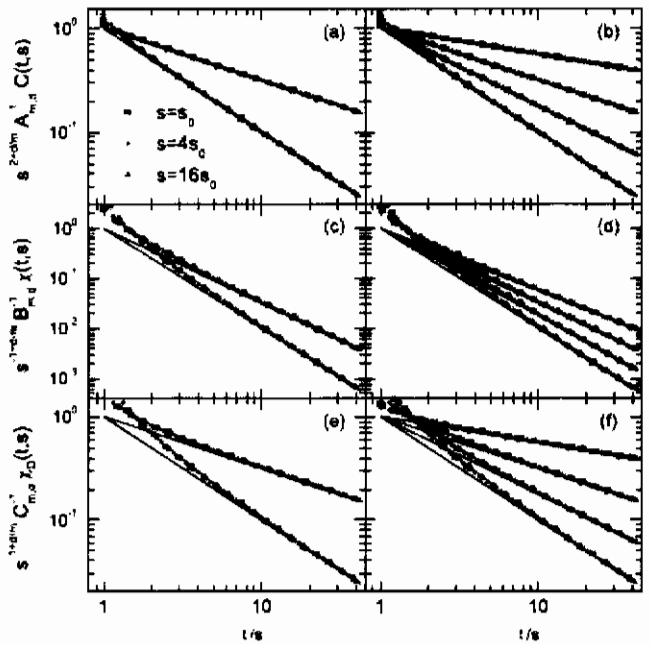

Figure 3. Global correlation (a), (b), global response to a change of the surface tension (c), (d), and global response to a change of the noise strength (e), (f) when both times t and s are in the correlated regime. The symbols are obtained by numerically evaluating the exact expressions (24), (35), and (44) whereas the lines indicate the asymptotic power-laws (28), (39), and (48). Panels (a), (c), and (e) show data for the EW case and dimensions $d = 1, 2$ (from top to bottom), panels (b), (d) and (f) show data for the MH case and dimensions $d = 1, 2, 3, 4$ (from top to bottom). The different symbols correspond to different waiting times, where $s_0 = 1000$ below the critical dimension and $s_0 = 200$ at the critical dimension (which is $d = 2$ for EW and $d = 4$ for MH). The linear extension of the system is $L = 2^{14}$ for $d = 1$, $L = 2^9$ for $d = 2$, $L = 2^7$ for $d = 3$, and $L = 2^6$ for $d = 4$.

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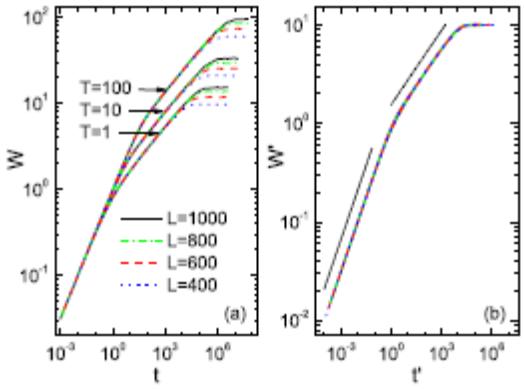

FIG. 4. (Color online) (a) Log-log plot of the surface width vs time for the temperature-dependent deposition model. Systems of different sizes at different temperatures are shown. (b) A complete data collapse of all data sets is also achieved for this model. The dashed lines indicate the expected slopes in the RD and EW regimes.

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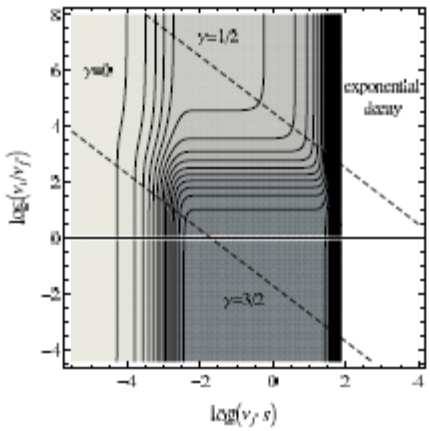

FIG. 3. (Color online) Contour plot of γ as a function of $\nu_f s$ and ν_i/ν_f for $t/s=\rho=64$. Four different regimes, separated by crossover regions, are identified. The two dashed lines separate the three qualitatively different types of behavior encountered when plotting the effective exponent as a function of t, see Fig. 5.

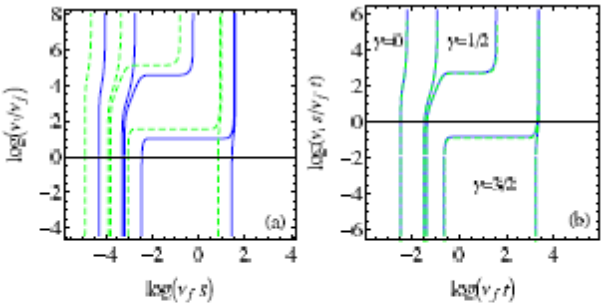

FIG. 4. (Color online) (a) Contour plots of γ as a function of $\nu_f s=\sigma$ and ν_i/ν_f for $t/s=\rho=64$ (full lines) and 256 (dashed lines). Only contours bounding the $\gamma=0$, 1/2 and 3/2 regimes are shown. (b) The same contour plots as shown in (a) but as a function of $\nu_f t$ and $\nu_i s/\nu_f t$. An approximate collapse of the contours is observed.

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