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Dissipative Processes with Infinite Memory ELVIS GENESTON, La Sierra Univ, MAURO BOLOGNA, Universidad de Tarapaca, ARKADII KROKHIN, PAOLO GRIGOLINI, University of North Texas — We study the process of random growth of surfaces approximating it by fractional Brownian motion (FBM) with scaling index H. The diffusion trajectories generated by the ballistic deposition ($H = 1/3$) and Edward-Wilkinson ($H = 1/4$) models are analyzed and the distribution of time intervals between two consecutive origin re-crossings are calculated numerically. This distribution follows the inverse power-law, $\psi(\tau) \propto 1/\tau^{\mu}$. For pure FBM $\mu = 2 - H$ if $1/3 < H < 1$ and $\mu = 1 + 2H$ if $0 < H < 1/3$. As was recently shown, the latter case is a direct manifestation of the infinite memory of the FBM trajectories. Our results demonstrate that because of friction, which is usually neglected in the processes of random growth of surfaces, the relation $\mu = 2 - H$ holds true for the Edward-Wilkinson model ($H = 1/4$). Thus, the new regime with persistency given by $\mu = 1 + 2H$ cannot be observed in the diffusion processes where even weak dissipation is present.

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