Barriers distribution for manifolds driven through disorder

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Abstract

We consider the low-temperature dynamics of an elastic manifold driven through a random medium. For driving forces well below the $T = 0$ depinning force, the medium advances via thermally activated hops over the energy barriers separating favorable metastable states. We show that the distribution of waiting times τ for these hopping processes scales as a power-law $\Psi \propto 1/\tau^{1+\alpha}$. This power-law distribution naturally yields a nonlinear glassy response for the driven medium, $v \sim \exp(-\text{const} \times F^{-\mu})$.