INTEGRATED DENSITY OF STATES FOR SUBORDINATE BROWNIAN MOTION ON THE SIERPIŃSKI GASKET: EXISTENCE AND ASYMPTOTICS

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We prove the existence of the integrated density of states for the subordinate Brownian motions on the infinite Sierpiński gasket, evolving in the environment influenced by a killing Poissonian potential. Such a potential is given by

$$V^\omega(x,y) = \int_{\mathcal{G}} W(x,y)\mathrm{d}\mu^\omega(y),$$

where $\mathcal{G}$ denotes the gasket, μ^ω is the random Poisson point measure on $\mathcal{G}$, and W is the profile function. For a vast class of subordinate Brownian motions and potentials the integrated density of states exists, is nonrandom, and is the same for both the Dirichlet and the Neumann boundary conditions.

Having proven the existence of the integrated density of states for subordinate Brownian motions, we prove that it exhibits the so-called Lifschitz singularity near the origin. Denoting by $\ell(\lambda)$ this limiting object, we prove the following.

Theorem 1. *There exist two constants: $C > 0$ and $D > 0$ such that*

$$-C\nu \leq \liminf_{\lambda\to 0} \lambda^{d_s/\alpha} \log \ell([0,\lambda]) \leq \limsup_{\lambda\to 0} \lambda^{d_s/\alpha} \log \ell([0,\lambda]) \leq -D\nu.$$

References

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