Weyl type spectral asymptotics for Laplacians on Sierpinski carpets

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Let $\{\lambda_n\}_{n\geq 1}$ be the eigenvalues of the Laplacian associated with the Brownian motion on a generalized (i.e. possibly higher dimensional) Sierpinski carpet, and let $Z(t) := \sum_{n=1}^{\infty} e^{-\lambda_n t}$, $t > 0$. B. M. Hambly has shown that there exists a strictly positive periodic continuous function G_0 such that $Z(t) - t^{-d_f/d_w} G(\log t^{-1}) = o(t^{-d_f/d_w})$ as $t \downarrow 0$, where d_f (resp. d_w) is the Hausdorff dimension (resp. walk dimension) of the carpet.

In this talk I will present the following two results closely related to Hambly's result above:

(1) $Z(t) - t^{-d_f/d_w} G(\log t^{-1})$ in the above formula also admits a similar asymptotic behavior.

(2) Even if we consider a time change (with respect to a self-similar measure) of the original Brownian motion on the carpet, the associated partition function admits a similar asymptotic behavior as long as the corresponding heat kernel is subject to the Sub-Gaussian upper bound.