1077-60-952 **Naotaka Kajino*** (nkajino@math.uni-bielefeld.de), Department of Mathematics, University of Bielefeld, Postfach 10 01 31, 33501 Bielefeld, Germany. *On-diagonal oscillation of the heat kernels on p.c.f. self-similar fractals.*

It is a general belief that the heat kernels on fractals should exhibit highly oscillatory behaviors. For example, on a class of finitely ramified fractals, called (affine) nested fractals, a canonical *"Brownian motion"* has been constructed and its transition density (heat kernel) $p_t(x,y)$ satisfies

$$c_1 \leq t^{d_s/2} p_t(x,x) \leq c_2, \quad t \in (0,1]$$

for any point x of the fractal; here $c_1, c_2 \in (0,\infty)$ are some constants and d_s is called the spectral dimension. Then it is natural to ask whether the limit

$$\lim_{t \downarrow 0} t^{d_s/2} p_t(x,x)$$

exists or not, and it is conjectured NOT to exist by many people.

In this talk, we will present partial affirmative answers to this conjecture. First, for a general (affine) nested fractal, the non-existence of the limit $\lim_{t\downarrow 0} t^{d_s/2} p_t(x,x)$ is shown to be true for a "generic" (in particular, almost every) point x. Secondly, the same is shown to be valid for ANY point x of the fractal in the particular cases of the d-dimensional standard Sierpinski gasket with $d \geq 2$ and of the N-polygasket with $N \geq 3$ odd, e.g. the pentagasket ($N = 5$) and the heptagasket ($N = 7$). (Received September 14, 2011)