1062-58-137 **Naotaka Kajino*** (`kajino.n@acs.i.kyoto-u.ac.jp`), Graduate School of Informatics, Kyoto University, Yoshida-honmachi, Sakyo-ku, Kyoto, 606-8501, Japan. *Heat kernel asymptotics for the measurable Riemannian structure on the Sierpinski gasket.*

Kigami [*Math. Ann.* **340** (2008), 781–804] has introduced the notion of the *'measurable Riemannian structure'* on the Sierpinski gasket, where we have the analogues of the basic objects in Riemannian geometry like the gradient vector fields of functions, the Riemannian volume measure μ and the geodesic metric $d_{\mathcal{H}}$. Moreover, Kigami has shown in the same paper that the associated heat kernel $p_t^{\mathcal{H}}(x,y)$ is subject to the two-sided Gaussian bound

$$p_t^{\mathcal{H}}(x,y) \asymp \frac{c_1}{\mu\bigl(B_{\sqrt{t}}(x,d_{\mathcal{H}})\bigr)} \exp\left(-\frac{d_{\mathcal{H}}(x,y)^2}{c_2 t}\right) \tag{1}$$

in spite of the fractal nature of the space.

In this talk various short time asymptotic behaviors of $p_t^{\mathcal{H}}(x,y)$ will be presented. In particular, we show the so-called *Varadhan's asymptotic relation*

$$\lim_{t\downarrow 0} 2t \log p_t^{\mathcal{H}}(x,y) = -d_{\mathcal{H}}(x,y)^2, \tag{2}$$

and also the existence of the limit $\lim_{t\downarrow 0} t^{1/2} p_t^{\mathcal{H}}(x,x) \in (0,\infty)$ for every junction point x.

JSPS Research Fellow PD (20·6088): The author is supported by the Japan Society for the Promotion of Science. (Received August 03, 2010)