1123-60-67 **Panki Kim** and **Renming Song*** (`rsong@illinois.edu`), Department of Mathematics, University of Illinois at Urbana-Champaign, Urbana, IL 61801, and **Zoran Vondracek**. *Heat kernels of non-symmetric jump processes:beyond the stable case.*

Let J be the Lévy density of a symmetric Lévy process in $\mathbb{R}^d$ with its Lévy exponent satisfying a weak lower scaling condition at infinity. Consider the non-symmetric and non-local operator

$$\mathcal{L}^\kappa f(x) := \lim_{\epsilon \downarrow 0} \int_{\{z \in \mathbb{R}^d : |z| > \epsilon\}} (f(x+z) - f(z))\kappa(x,z) J(z)\, dz\,,$$

where $\kappa(x,z)$ is a Borel measurable function on $\mathbb{R}^d \times \mathbb{R}^d$ satisfying $0 < \kappa_0 \le \kappa(x,z) \le \kappa_1$, $\kappa(x,z) = \kappa(x,-z)$ and $|\kappa(x,z) - \kappa(y,z)| \le \kappa_2 |x-y|^\beta$ for some $\beta \in (0,1)$. We construct the heat kernel $p^\kappa(t,x,y)$ of $\mathcal{L}^\kappa$, establish its upper bound as well as its fractional derivative and gradient estimates. Under an additional weak upper scaling condition at infinity, we also establish a lower bound for the heat kernel p^κ. (Received August 15, 2016)