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Real-variable Characterizations of Orlicz-Hardy Spaces on Strongly Lipschitz Domains of $\mathbb{R}^n$

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Let Ω be a strongly Lipschitz domain of $\mathbb{R}^n$, whose complement in $\mathbb{R}^n$ is unbounded. Let L be a second order divergence form elliptic operator on $L^2 (\Omega)$ with the Dirichlet boundary condition, and the heat semigroup generated by L have the Gaussian property $(G_{\mathrm{diam}(\Omega)})$ with the regularity of their kernels measured by $\mu\in(0,1]$, where $\mathrm{diam}(\Omega)$ denotes the diameter of Ω. Let Φ be a continuous, strictly increasing, subadditive and positive function on $(0,\infty)$ of upper type 1 and of strictly critical lower type $p_{\Phi}\in(n/(n+\mu),1]$. In this paper, the authors introduce the Orlicz-Hardy space $H_{\Phi,\,r}(\Omega)$ by restricting arbitrary elements of the Orlicz-Hardy space $H_{\Phi}(\mathbb{R}^n)$ to $\boz$ and establish its atomic decomposition by means of the Lusin area function associated with $\{e^{-tL}\}_{t\ge0}$. Applying this, the authors obtain two equivalent characterizations of $H_{\Phi,\,r}(\boz)$ in terms of the nontangential maximal function and the Lusin area function associated with the heat semigroup generated by L.

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