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Lipschitz-Orlicz spaces and the Laplace equation. (English summary)

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Let M be a Young function and let φ be a continuous nondecreasing function which vanishes only at zero. The authors define the Lipschitz-Orlicz spaces, setting $\text{Lip}(\varphi, L_M) = \{f \in L_M(\mathbf{R}^n) : \|f(x+h) - f(x)\|_M \leq C\varphi(|h|) \text{ for all } |h| > 0\}$ and analogously the Zygmund-Orlicz spaces $\text{Zyg}(\varphi, L_M) = \{f \in L_M(\mathbf{R}^n) : \|f(x+h) + f(x-h) - 2f(x)\|_M \leq C\varphi(|h|) \text{ for all } |h| > 0\}$. They give a characterization of those $f \in L_M(\mathbf{R}^n)$ which lie in the spaces $\text{Lip}(\varphi, L_M)$ and $\text{Zyg}(\varphi, L_M)$ in terms of their Poisson integrals. These results extend to Orlicz spaces the well-known results of Stein and Taibleson. More general spaces $\Lambda^k(\varphi, X, q)$ are also considered in this paper.

Reviewed by *Abdelmoujib Benkirane*

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