1015-35-150 **Caroline Sweezy*** (csweezy@nmsu.edu), Department of Mathematical Sciences, New Mexico State University, Box 30001, 3MB, Las Cruces, NM 88003-8001. *A special Littlewood-Paley type inequality with application to weights on a bounded, rough domain.*

The question of which measures, μ and ν, defined on a bounded Lipschitz domain Ω in R^n, can guarantee that (1) $\left(\int_\Omega |\nabla u(x)|^q \, d\mu(x)\right)^{1/q} \leq C \left(\int_\Omega (|\nabla \cdot f(x)|^p + |f(x)|^p) \, d\nu(x)\right)^{1/p}$ is valid for any solution to the elliptic pde $Lu = \nabla \cdot f$ in Ω, $u = 0$ on $\partial\Omega$, is addressed. For $L = \sum_{i,j=1}^n \partial/\partial x_i(a_{i,j}(x)\partial/\partial x_j)$, a strictly elliptic operator with bounded and measurable coefficients on Ω, sufficient conditions can be given for which (1) is valid for a narrow range of p and q. It is shown that replacing the gradient of u by a local Holder norm allows one to state conditions on μ and ν for which (1) holds for any $1 < p < \infty$ and any $0 < q < \infty$. The method of proof follows Wheeden and Wilson: a dual operator argument with a Littlewood-Paley type inequality. (Received February 02, 2006)