1118-43-75 **krystal taylor***, The Ohio State University. *Fractional maximal operators and intersections of sets.*

We establish L^p bounds for the Bourgain-Stein spherical maximal operator in the setting of compactly supported Borel measures μ, ν satisfying natural local size assumptions $\mu(B(x,r)) \leq Cr^{s_\mu}, \nu(B(x,r)) \leq Cr^{s_\nu}$. Taking the supremum over all $t > 0$ is not in general possible for reasons that are fundamental to the fractal setting, but we are able to obtain single scale ($t \in [1,2]$) results. As an application, we consider to what extent it is possible to obtain a lower bound on the dimension of a set from a lower bound on the dimension of the intersection of this set with a suitably large collection of manifolds. (Received January 21, 2016)