1092-28-38   **Matthew Badger*** (`badger@math.sunysb.edu`) and **Raanan Schul**. *Multiscale analysis of 1-rectifiable measures.*

We repurpose tools from the theory of quantitative rectifiability to study the qualitative rectifiability of measures in n-dimensional Euclidean space, $n \geq 2$. To each locally finite Borel measure μ, we associate a function $\widetilde{J}_2(\mu, x)$ which uses a weighted sum to record how closely the mass of μ is concentrated on a line in the triples of dyadic cubes containing x. This function is a "geometric analogue" of a square function from harmonic analysis. We show that $\widetilde{J}_2(\mu, \cdot) < \infty$ μ-almost everywhere is a necessary condition for μ to give full mass to a countable family of rectifiable curves. This confirms a conjecture of Peter Jones from 2000. A novelty of this result is that no assumption is made on the upper Hausdorff density of the measure. Thus we are able to analyze general 1-rectifiable measures, including measures which are singular with respect to 1-dimensional Hausdorff measure. (Received July 12, 2013)