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Jasun Gong* (jasun@pitt.edu), Department of Mathematics, University of Pittsburgh, 301 Thackeray Hall, Pittsburgh, PA 15260. *Rigidity of Derivations on the Plane and Applications.*

We will discuss the structure of doubling measures that admit weak $(1,p)$ -Poincaré inequalities on metric spaces. In particular, we will address two conjectures about such measures in the case of the Euclidean plane. The proofs will mainly use techniques from two areas: (1) N. Weaver's theory of derivations on measure spaces, and (2) the structure of null sets on the plane, as studied by G. Alberti, M. Csornyei, and D. Preiss. (Received February 02, 2009)