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John M Mackay and **Jeremy T Tyson*** (tyson@math.uiuc.edu), Department of Mathematics, University of Illinois, 1409 West Green St, Urbana, IL 61801, and **Kevin Wildrick**. *Modulus and Poincaré inequalities on non-self-similar Sierpiński carpets.*

Metric spaces equipped with a doubling measure which support a Poincaré inequality are ideal environments for first-order analysis and differential geometry. We extend the scope of this theory by verifying Poincaré inequalities for a new class of spaces. We characterize non-self-similar Sierpiński carpets in the plane which support curve families of nontrivial modulus and which support Poincaré inequalities, when equipped with Lebesgue measure. The answer is given in terms of certain precise summability conditions on the sequence of scales of the omitted squares. Our results yield new examples of compact doubling metric measure spaces which support Poincaré inequalities: these examples have no manifold points yet embed isometrically in Euclidean space. (Received August 05, 2010)