1165-53-181 **Samuel Lin*** (samuel.z.lin@dartmouth.edu), Department of Mathematics, 27 N. Main St., Hanover, NH 03755, and **Benjamin Schmidt** and **Craig Sutton**. *Towards hearing three-dimensional geometric structures, Part II.*

The positive resolution of the geometrization conjecture shows that three-dimensional geometric structures (i.e., complete locally homogeneous metrics) play a special role in our understanding of the taxonomy of three-dimensional manifolds. In light of this, we initiate the exploration of the extent to which three-dimensional geometric structures are determined by their spectra. For example, we find that among locally homogeneous manifolds, closed three-manifolds modeled on six of the eight Thurston geometries are determined up to universal Riemannian cover by their spectra, a result that includes all compact locally symmetric spaces. More generally, we obtain results concerning spaces modeled on "metrically maximal geometries." This is joint work with Ben Schmidt and Craig Sutton. (Received January 17, 2021)