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Cassie Putman Micucci* (cputman@vols.utk.edu), **Adam Spannaus** and **Vasileios Maroulas**. *A Stable Cardinality Distance for Topological Classification*.

This work incorporates topological and geometric features via persistence diagrams to classify point cloud data arising from materials science. Persistence diagrams are planar sets that summarize the shape details of given data. A new metric on persistence diagrams generates input features for the classification algorithm. The metric accounts for the similarity of persistence diagrams using a linear combination of matching costs and cardinality differences. Investigation of the stability properties of this metric provides theoretical justification for the use of the metric for comparisons of such diagrams. The crystal structure of materials are successfully classified based on noisy and sparse data retrieved from synthetic Atomic Probe Tomography experiments. (Received January 24, 2019)