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**Benjamin Schweinhart\*** (bschwein@math.princeton.edu), 14 Lawrence Drive, Apt 204, Princeton, NJ 08540, and **Jeremy Mason** and **Robert MacPherson**. *Topological Similarity of Random Cell Complexes and Applications to Dislocation Configurations*.

Although random cell complexes occur throughout the physical sciences, there does not appear to be a standard way to quantify their statistical similarities and differences. The various proposals in the literature are usually motivated by the analysis of particular physical systems and do not necessarily apply to general situations. The central concepts in this paper—the swatch and the cloth—provide a description of the local topology of a cell complex that is general (any physical system that may be represented as a cell complex is admissible) and complete (any statistical question about the local topology may be answered from the cloth). Furthermore, this approach allows a distance to be defined that measures the similarity of the local topology of two cell complexes. The distance is used to identify a steady state of a model dislocation network evolving by energy minimization, and then to rigorously quantify the approach of the simulation to this steady state. (Received July 28, 2014)