Institut f. Geometrie

Geometrie-Seminar

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Seminarraum 2, Kopernikusgasse 24/IV

Using multi-cover persistent homology as a fingerprint for periodic crystals

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As the atoms in periodic crystals are arranged periodically, such a crystal can be modeled by a periodic point set, i.e. by the union of several translates of a lattice. Two periodic point sets are considered equivalent if there is a rigid motion from one to the other. A periodic point set can be represented by a finite cutout s.t. copying this cutout infinitely often in all directions yields the periodic point set. The fact that these cutouts are not unique creates problems when working with them. Therefore, material scientists would like to work with a complete, continuous invariant instead. We conjecture that a variant of persistent homology, namely the sequence of k-fold cover persistence diagrams for all positive integers k, is such a complete, continuous invariant for equivalence classes of periodic point sets

Michael Kerber