COMPACTNESS FOR MANIFOLDS WITH BOUNDED VOLUME AND DIAMETER

STEFAN WENGER

UNIVERSITY OF ILLINOIS AT CHICAGO

Abstract. Gromov's compactness theorem for metric spaces asserts that every uniformly compact sequence of metric spaces has a subsequence which converges in the Gromov-Hausdorff sense to a compact metric space. This theorem has been of great importance in Riemannian and metric geometry and also other fields. I will show in this talk that if one replaces the Hausdorff distance appearing in Gromov's theorem by the filling volume or flat distance then every sequence of oriented k-dimensional Riemannian manifolds with a uniform bound on diameter and volume has a subsequence which converges in this new distance to a countably k-rectifiable metric space. In general, such a sequence does not have a subsequence which converges with respect to the Gromov-Hausdorff distance. The new distance mentioned above was first introduced and studied by Christina Sormani and myself. In the talk, which will be self-contained, I will also explain the basic properties of this distance, its relationship with other distances, and illustrate it by examples.