Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)
Vol. XVIII (2018), 593-610

On the volume measure of non-smooth spaces with Ricci curvature bounded below

MARTIN KELL AND ANDREA MONDINO

Abstract. We prove that, given an $\mathsf{RCD}^*(K,N)$-space $(X,\mathsf{d},\mathfrak{m})$, it is possible to $\mathfrak{m}$-essentially cover X by measurable subsets $(R_i)_{i\in\mathbb{N}}$ with the following property: for each i there exists $k_i \in \mathbb{N}\cap[1,N]$ such that $\mathfrak{m}\llcorner R_i$ is absolutely continuous with respect to the k_i-dimensional Hausdorff measure. We also show that a Lipschitz differentiability space which is locally bi-Lipschitz embeddable into Euclidean spaces is rectifiable as a metric measure space, and we conclude with an application to Alexandrov spaces.

Mathematics Subject Classification (2010): 53C23 (primary); 46G05, 30L99, 49J52 (secondary).