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Igor Belegradek* (ib@math.gatech.edu). *Obstructions to nonpositive curvature for open manifolds.*

We study algebraic conditions on a group G under which every properly discontinuous, isometric G -action on a Hadamard manifold has a G -invariant Busemann function. For such G we prove the following structure theorem: every open complete nonpositively curved Riemannian $K(G, 1)$ manifold that is homotopy equivalent to a finite complex of codimension ≥ 3 is an open regular neighborhood of a subcomplex of the same codimension. In this setting we show that each tangential homotopy type contains infinitely many open $K(G, 1)$ manifolds that admit no complete nonpositively curved metric even though their universal cover is the Euclidean space. A sample application is that an open contractible manifold W is homeomorphic to a Euclidean space if and only if $W \times S^1$ admits a complete Riemannian metric of nonpositive curvature. (Received September 04, 2012)