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Nadine Badr* (badr@math.univ-lyon1.fr), Institut Camille Jordan, Universite Claude Bernard Lyon 1, 43 boulevard du 11 novembre 1918, Villeurbanne, F-69622, and **Galia Dafni** (gdafni@mathstat.concordia.ca), Department of Mathematics and Statistics, Concordia University, 1455 de Maisonneuve Blvd. West, Montreal, Quebec H3G1M8. *An atomic decomposition of the Hajlasz Sobolev space M_1^1 on manifolds*

We compare several possible notions of Hardy-Sobolev spaces on a Riemannian manifold with a doubling measure. We consider characterizations of these spaces in terms of maximal functions, atomic decompositions, and gradients, and identify them with the L^1 Sobolev space M_1^1 , defined by Hajlasz. We obtain atomic decompositions in both the homogeneous and non-homogeneous cases. (Received September 15, 2009)