

1053-42-376

**Nadine Badr\*** ([badr@math.univ-lyon1.fr](mailto: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](mailto: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)