

WEIGHTED HARDY SPACES ASSOCIATED  
WITH ELLIPTIC OPERATORS.  
PART II: CHARACTERIZATIONS OF  $H_L^1(w)$

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**Abstract:** Given a Muckenhoupt weight  $w$  and a second order divergence form elliptic operator  $L$ , we consider different versions of the weighted Hardy space  $H_L^1(w)$  defined by conical square functions and non-tangential maximal functions associated with the heat and Poisson semigroups generated by  $L$ . We show that all of them are isomorphic and also that  $H_L^1(w)$  admits a molecular characterization. One of the advantages of our methods is that our assumptions extend naturally the unweighted theory developed by S. Hofmann and S. Mayboroda in [19] and we can immediately recover the unweighted case. Some of our tools consist in establishing weighted norm inequalities for the non-tangential maximal functions, as well as comparing them with some conical square functions in weighted Lebesgue spaces.

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