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GAGLIARDO-NIRENBERG INEQUALITIES FOR DIFFERENTIAL  
FORMS IN HEISENBERG GROUPS

(joint research with A. Baldi and P. Pansu)

Abstract. The  $L^1$ -Sobolev inequality states that for compactly supported functions  $u$  on the Euclidean  $n$ -space, the  $L^{n/(n-1)}$ -norm of a compactly supported function is controlled by the  $L^1$ -norm of its gradient. The generalization to differential forms (due to Lanzani & Stein and Bourgain & Brezis) is recent, and states that a the  $L^{n/(n-1)}$ -norm of a compactly supported differential  $h$ -form is controlled by the  $L^1$ -norm of its exterior differential  $du$  and its exterior codifferential  $\delta u$  (in special cases the  $L^1$ -norm must be replaced by the  $H^1$ -Hardy norm). We extend this result to Heisenberg groups in the framework of an appropriate complex of differential forms.