

Magnetic Hardy inequalities in the Heisenberg group

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We introduce a notion of magnetic field in the Heisenberg group and we study its influence on spectral properties of the corresponding magnetic (sub-elliptic) Laplacian. We show that uniform magnetic fields uplift the bottom of the spectrum. For magnetic fields vanishing at infinity, including Aharonov-Bohm potentials, we derive magnetic improvements to a variety of Hardy-type inequalities for the Heisenberg sub-Laplacian. In particular, we establish a sub-Riemannian analogue of Laptev and Weidl sub-criticality result for magnetic Laplacians in the plane. This is joint work with Biagio Cassano, Valentina Franceschi and Dario Prandi.

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