

Jean-Michel Bismut, Université Paris-Sud, Orsay

Colloquium talk: **The hypoelliptic Laplacian**

If X is a Riemannian manifold, the Laplacian is a second order elliptic operator on X . The hypoelliptic Laplacian L_b is an operator acting on the total space \mathcal{X} of the tangent bundle of X , that is supposed to interpolate between the elliptic Laplacian (when $b \rightarrow 0$) and the geodesic flow (when $b \rightarrow +\infty$). Up to lower order terms, L_b is a weighted sum of the harmonic oscillator along the fibre TX and of the generator of the geodesic flow. One expects that, in this deformation, there are conserved quantities.

In the talk, I will explain the underlying algebraic, analytic and probabilistic aspects of its construction.