1053-58-298   **Thierry Coulhon*** (`thierry.coulhon@recherche.gouv.fr`). *Riesz meets Sobolev.*
We show that the L^p boundedness, $p > 2$, of the Riesz transform on a complete non-compact Riemannian manifold with upper and lower Gaussian heat kernel estimates is equivalent to a certain form of Sobolev inequality. We also characterize in such terms the heat kernel gradient upper estimate on manifolds with polynomial growth. This is a joint work with Adam Sikora. (Received September 07, 2009)