



SCUOLA  
NORMALE  
SUPERIORE

## SEMINARIO DI MATEMATICA

**Lunedì 21 gennaio 2019**  
ore 14:00

Scuola Normale Superiore  
Pisa  
Aula Bianchi Scienze

**Valentina Franceschi**

(Université Paris Sud, Orsay, France)

Terrà un seminario dal titolo:

**“On the essential self-adjointness of sub-Laplacians”**

***Abstract:***

The aim of this seminar is to present some recent results on the essential self-adjointness of sub-Laplacians. Given a smooth manifold  $M$ , a sub-Laplacian is a hypoelliptic operator  $H$ , naturally associated to a sub-Riemannian geometric structure and to a volume measure on it. If the structure is Riemannian and complete, the associated Laplace-Beltrami operator (in this case the volume is the intrinsic Riemannian measure) is essentially self-adjoint. This amounts to say that the solutions to the Schrodinger equation on  $M$  are well defined without imposing any boundary conditions. If the structure is sub-Riemannian, sub-Laplacians are also essentially self-adjoint, assuming completeness of the metric structure and smoothness of the volume measure. In this seminar, we address the case where the structure is sub-Riemannian and (1) either the measure (chosen to be intrinsic) is non-smooth, (2) or the metric structure is non-complete. Regarding (1), we present results concerning sub-Riemannian structures endowed with singular measures. A standing conjecture, formulated by Boscain and Laurent asserts that singular sub-Laplacians are essentially self-adjoint out of the singularity. We will explain our results supporting the conjecture and underline the cases that are not included in our analysis. Regarding (2), we present recent results on 3D sub-Laplacians defined on non-complete sub-Riemannian manifolds, obtained by removing a point from a complete one. We show that, unlike the 3D Euclidean case, essential self-adjointness holds in this setting.

This is a joint work with R.~Adami, U.~Boscain and D.~Prandi.

**Tutti gli interessati sono invitati a partecipare.**