## COLLOQUIUM

## 15/04/2019 – UNIVERSITÀ MILANO-BICOCCA

## SIMPLICIAL VOLUME AND AMENABLE COVERINGS

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**Abstract.** Simplicial volume is a homotopy invariant of compact manifolds introduced by Gromov in the early '80s. It measures the complexity of manifolds in terms of (real) singular chains. Despite its topological meaning, simplicial volume has many applications in geometry. For instance it provides useful information about the Riemannian volume of negatively curved manifolds.

However, as soon as we consider non-compact manifolds its geometric meaning is much more mysterious. Indeed, one may extend the notion of simplicial volume to non-compact manifolds by considering locally finite homology, but its behaviour is not yet well understood. Among the key ingredients for studying the simplicial volume of (non-)compact manifolds, *amenable groups* play a fundamental role. Recall that amenable groups are groups carrying invariant means.

The aim of this talk is to investigate the relation between simplicial volume and amenable groups. More precisely, after having introduced the notion of *amenable covering* of compact manifolds, we will discuss a classical vanishing result for the simplicial volume. Later we will construct special amenable coverings of non-compact manifolds. This will allow us to obtain the corresponding vanishing result in this setting.

If there will be enough time, we will discuss a striking application of these results: the simplicial volume of the product of at least three non-compact manifolds always vanishes.

Some results presented in this talk are part of a joint work with Roberto Frigerio.

The Colloquium will take place at 14:00 in room 3014 of the Department of Matematics and Applications