SUB-RIEMANNIAN SOAP BUBBLES

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Abstract:

The aim of this seminar is to present some results about minimal bubble clusters in some sub-Riemannian spaces. This amounts to finding the best configuration of $m \in \mathbb{N}$ regions in a sub-Riemannian manifold enclosing given volumes, in order to minimize their total perimeter. In a n-dimensional sub-Riemannian manifold, the perimeter is a non-isotropic $(n-1)$-dimensional measure that is defined according to the geometry. After an introduction to the subject, we will present some results concerning the cases $m = 1$ (isoperimetric problem) and $m = 2$ (double bubble problem), in a class of sub-Riemannian structures connected to the Heisenberg geometry. This is the framework of an open problem about the shape of isoperimetric sets, known as Pansu's conjecture. The results that will be presented are based on joint works with Roberto Monti (University of Padova), Aldo Pratelli (University of Pisa) and Giorgio Stefani (SNS, Pisa).