Planar minimizing clusters with double density

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The aim of this seminar is to present some results about minimal bubble clusters in the plane with double density. This amounts to finding the best shape of $m \in \mathbb{N}$ regions in the plane with given volumes, in order to minimize their total perimeter, in the case where volume and perimeter are weighted by suitable densities. After an overview concerning existence of minimizers, we will focus on their Steiner regularity, i.e., the fact that their boundaries are made of regular curves meeting at 120 degrees. We will show that this holds in a wide generality. Although our initial motivation came from the study of a particular sub-Riemannian framework known as the Grushin plane, our approach works in wide generality and is new even in the classical Euclidean case Based on joint works with Aldo Pratelli (University of Pisa) and Giorgio Stefani (SNS, Pisa).