CINTIA PACCHIANO, University of Calgary

Regularity Results for Double Phase Problems on Metric Measure Spaces

In this talk, we present local and global higher integrability properties for quasiminimizers of a class of double-phase integrals characterized by non-standard growth conditions. We work purely on a variational level in the setting of a doubling metric measure space supporting a Poincaré inequality. The main novelty is the use of an intrinsic approach, based on a double-phase Sobolev-Poincaré inequality.

During the past two decades, a theory of Sobolev functions and first degree calculus has been developed in this abstract setting. A central motivation for developing such a theory has been the desire to unify the assumptions and methods employed in various specific spaces, such as weighted Euclidean spaces, Riemannian manifolds, Heisenberg groups, graphs, etc.

Analysis on metric spaces is nowadays an active and independent field, bringing together researchers from different parts of the mathematical spectrum. It has applications to disciplines as diverse as geometric group theory, nonlinear PDEs, and even theoretical computer science. This can offer us a better understanding of the phenomena and also lead to new results, even in the classical Euclidean case.