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Beyond Classical Poincaré Inequalities: Double-Phase Problems in Metric Spaces

In this talk, I will discuss different Poincaré and Sobolev-Poincaré inequalities that arise in the study of double-phase problems in metric measure spaces. These problems involve functionals with nonstandard growth, where the energy depends on two different powers of the gradient and a spatially varying coefficient. I will focus on how the growth exponents, the regularity of the coefficient, and the properties of the underlying space affect the inequalities we can establish. I will also explain how these estimates are used to obtain higher integrability and regularity results for quasiminimizers.

The talk is based on joint works with Juha Kinnunen (Aalto University) and Antonella Nastasi (University of Palermo).