Problems of double phase type: some existence and regularity results

Calogero Vetro
Department of Mathematics and Computer Science, University of Palermo,
Via Archirafi 34, 90123, Palermo, Italy
calogero.vetro@unipa.it

Abstract: This talk is aimed to presenting some recent results for solutions of perturbed elliptic equations and minimizers of variational integrals, in the case of double phase functionals. Such functionals lead to a special class of problems with nonstandard growth and nonuniform ellipticity, as discussed by Marcellini, Zhikov and of course by Mingione, who revived and expanded this theory. In this talk, starting from the basic mathematical background, much attention is paid to the discussion of the functional spaces from the Lebesgue and Sobolev spaces, with both constant and variable exponents, to the generalized Musielak-Orlicz spaces and metric mesure spaces. Hence, following consolidated approach of the Calculus of Variations, I develop a unifying strategy to obtain embedding results and Sobolev-Poincaré inequalities. Using such preliminary materials together with several classical tools, I will present a summary of recent results on such models, obtained with Shengda Zeng, and co-workers.