Prescribed mass in the Born-Infeld problem and in a class of $(2, q)$-Laplacian equation

Laura Baldelli
Imag, Universidad de Granada
labaldelli@ugr.es

In this talk, we will disclose the main results contained in a recent paper written jointly with Jarosław Mederski (Institute of Mathematics Polish Academy of Sciences) and Alessio Pomponio (Polytechnic University of Bari).

The importance of the electromagnetic theory announced by Born and Infeld, which is a nonlinear alternative to the classical Maxwell theory, lies in giving a unitarian point of view to describe electrodynamics and notable feature to be a fine answer to the well-known *infinite-energy problem*. Motivated by the fact that physicists are often interested in normalized solutions, we will discuss some recent results concerning existence and nonexistence of normalized solutions to a large class of quasilinear problems, including the Born-Infeld operator.

Our main theorems cover the mass subcritical, critical, and supercritical cases, in the sense of the critical exponents $2(1+2/N)$, $q(1+2/N)$. In the mass subcritical cases, we study a global minimization problem and obtain a ground state solution for a $(2, q)$-type operator which implies the existence of solutions to the Born-Infeld problem. We also deal with the mass supercritical cases, getting an existence result by a mountain pass approach, while in the critical cases, we prove nonexistence results by using asymptotic decays of particular externals.