Schrödinger-Maxwell systems with interplay between coefficients and data

Luigi Orsina*
Dipartimento di Matematica
"Sapienza" Università di Roma
Roma, Italy

Abstract

I will present some results, obtained in collaboration with David Arcoya and Lucio Boccardo, concerning existence and summability of solutions for a Schrödinger-Maxwell system of equations:

$$\begin{cases} -\mathrm{div}(M(x)\nabla u) + \varphi\,|u|^{r-2}u = f(x)\,, & \text{in } \Omega, \\ -\mathrm{div}(N(x)\nabla\varphi) = |u|^{r}\,, & \text{in } \Omega, \\ u = \varphi = 0\,, & \text{on } \partial\Omega. \end{cases}$$

Here M and N are uniformly elliptic, bounded matrices, $r > 1$ and Ω is a bounded open subset of $\mathbb{R}^N$. The main feature of the system is the fact that the datum $f(x)$ is "controlled" by the coefficient $a(x)$ (which only belongs to $L^1(\Omega)$) in the sense that there exists a positive constant Q such that $|f(x)| \le Q\,a(x)$.

*e-mail: orsina@mat.uniroma1.it