Quasilinear elliptic problems with natural growth in the gradient and superlinear nonlinearities

David Arcoya, Universidad de Granada

For a continuous function $g \geq 0$ on $(0, +\infty)$ (which may be singular at zero), we confront a quasilinear elliptic differential operator with natural growth in ∇u with a superlinear nonlinearity. The model case is the study of the problem

$$-\Delta u + g(u)|\nabla u|^2 = \lambda(1+u)^p \quad \text{in } \Omega$$
$$u = 0 \text{ on } \partial\Omega.$$

where f is given either by $f(x,u) = \lambda u^p + f_0(x)$ ($f_0 \gneqq 0$), or by $f(x,u) = \lambda(1+u)^p$. The range of values of the parameter λ for which the associated homogeneous Dirichlet boundary value problem admits positive solutions depends on the behavior of g and on the exponent p. This is joint work with José Carmona and Pedro J. Martínez-Aparicio.