Overdetermined elliptic problems in exterior domains.

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Overdetermined elliptic systems of the form

$$\begin{cases} \Delta u + f(u) = 0 & \text{in} \quad \Omega \subset \mathbb{R}^n, n \geq 2 \\ u = 0 & \text{on} \quad \partial\Omega \\ \frac{\partial u}{\partial \vec{n}} = \text{constant} & \text{on} \quad \partial\Omega \end{cases}$$

appear in many problems in Physics and Applied Mathematics. In this talk, I will consider overdetermined elliptic systems in exterior domains, i.e. domains that are the complement of a compact region. I will present a symmetry results with classification of solution for the case where the PDE is a Allen-Cahn type equation, and a perturbation results with the construction of new solutions in the case where the PDE is the Nonlinear Schroedinger equation.