

Ground states of a nonlinear curl-curl problem

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In this talk I will report on recent joint work with Thomas Bartsch, Tomas Dohnal and Michael Plum. We are interested in ground states for the nonlinear curl-curl equation

$$\nabla \times \nabla \times U + V(x)U = \Gamma(x)|U|^{p-1}U \text{ in } \mathbb{R}^3, \quad U : \mathbb{R}^3 \rightarrow \mathbb{R}^3.$$

A basic requirement is to find scenarios, where 0 does not belong to the spectrum of the operator

$$\mathcal{L} = \nabla \times \nabla \times + V(x).$$

Under suitable assumptions on V, Γ we construct ground states both for the defocusing case ($\Gamma \leq 0$) and the focusing case ($\Gamma \geq 0$). The main tools are variational methods and the use of symmetries.