

Existence of solutions for a Schrödinger type equation

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Abstract:

We consider an elliptic system describing a Schrödinger equation in a suitable electromagnetic theory. This generalised electrodynamics was born in 1930's and was motivated by some restrictions of the classical Maxwell theory of electromagnetism.

From a mathematical point of view, the system we arrive in the stationary case involves two unknowns which are (i) the modulus of the wave function, via a "standard Schrödinger equation", and (ii) the electrostatic potential via a "biharmonic Gauss law".

We prove existence of solutions by means of variational methods. In particular a major role is played by a suitable truncation technique, used to obtain bounded Palais-Smale sequence, that, due to its generality, can be useful also in other variational problems.