

Nonlinear Schroedinger Equation on exotic domains

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Abstract:

In this short course I will present some aspects of the problem of the existence of Ground States for the Nonlinear Schroedinger Equation on exotic domains, like metric graphs and hybrids, namely, domains constructed by glueing together component of different space dimensions. I will follow this scheme:

1. Introduction: atomtronic and NLS on exotic structures. The definition and the meaning of a Ground State.
2. The role of topology of graphs, and a sufficient condition for the non existence of Ground States
3. The role of the metric of graphs in the existence and nonexistence. Examples.
4. The case of the critical nonlinear Schroedinger Equation. Why and how all previous intuitions fail.
5. The case of a simple hybrid.