QUALITATIVE PROPERTIES OF SOLUTIONS OF THE NONLINEAR SCHRÖDINGER EQUATION ON METRIC GRAPHS

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ABSTRACT. In this talk, we consider the nonlinear Schrödinger equation set on compact metric graphs. More precisely, we study qualitative properties of solutions (uniqueness, symmetries, nodal zones...). As this is a very delicate question in general, we focus on the "near-linear" regime. In this case, one can perform a Lyapunov-Schmidt reduction which leads us to study a "reduced problem" set on (finite dimensional) eigenspaces of the Laplacian on the graph. We will show that there are new phenomenon specific to graphs that we have to take care about. We then apply these results to the detailed study of solutions on some specific compact graphs to illustrate a varied behavior.

This is joint work with Colette De Coster (CERAMATHS/DMATHS) and Christophe Troestler (UMONS).