Local minimizers in absence of ground states for the critical NLS energy on metric graphs

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We consider the mass-critical nonlinear Schrödinger equation on non-compact metric graphs. A quite complete description of the structure of the ground states, which correspond to global minimizers of the energy functional under a mass constraint, has been recently provided by R. Adami, E. Serra and P. Tilli (*Comm. Math. Phys.* 352, no.1, 387-406, 2017). They proved that existence and properties of ground states depend in a crucial way on both the value of the mass, and the topological properties of the underlying graph. In this talk I present some results regarding cases when ground states do not exist and show that, under suitable assumptions, constrained local minimizers of the energy do exist. This result paves the way to the existence of stable solutions in the time-dependent equation in cases where the ground state energy level is not achieved.