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Title: Exact Controllability of the Nonlinear Schrödinger Equation in Exterior Domains

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Abstract: In this talk we present some results related with the boundary control problem of the semi-linear Schrödinger equation posed on a bounded domain Ω_0 of $\mathbb{R}^n$ with either the Dirichlet boundary conditions and Neumann boundary conditions. We consider the control inputs acting on a part of the boundary of Ω_0. First, we prove that this problem is shown to be equivalent to prove an internal controllability of the Schrödinger equation on a *exterior domain* Ω of $\mathbb{R}^n$. To prove the internal controllability, the system is linearized around the origin and the corresponding linear system is proved to be locally exactly controllable in the classical Sobolev space $H^s(\Omega)$, for $s \geq -1$, using unique continuation property for the linearized system associated. However, the unique continuation property does not work when the system is linearized around any smooth solution of the cubic Schrödinger equation. Thus, with help of Carleman estimate, we prove that the system is exactly controllable in $H_0^1(\Omega)$ around any smooth solution of the cubic Schrödinger equation. Finally, using Strichartz estimates and contraction mapping principle we extend our result (locally) to the nonlinear system without and with variable coefficients.