

Propagation of Gaussian wave packets in quantum thin periodic waveguides with nonlocal nonlinearity

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November 3, 2007

We consider nonlinear Schrödinger equation with an integral Hartree-type nonlinearity in thin waveguide. We study propagation of Gaussian wave packets localized in the space. In the case of periodically changing walls of the waveguide we establish the relationship between the behavior of wave packets and spectral properties of some additional 1-D periodic linear Sturm-Liouville problem. We show that in the case of positive nonlinear term in contrary to linear situation the wave packets may not spread. More over we show that the wave packets can be focused periodically focused in space and time depending on the spectrum of mentioned 1-D periodic problem.

This work was done together with J.Brüning, R.Nekrasov and A.Shafarevich and was supported by projects DFG-RAS (DFG 436 RUS 113/572) and RFBR-CNRS, N 05-01-22002.