

**Gutkin, Eugene**

**Quantum nonlinear Schrödinger equation and its classical counterpart.** (English)

Zbl 0596.35026

Physica D 18, 378-379 (1986).

The author considers the quantum nonlinear Schrödinger equation of the form

$$i\psi_t = -\psi_{xx} + 2c\psi^\dagger(x)\psi(x)^2,$$

where  $\psi^\dagger(x, t)$  and  $\psi(y, t)$  are the time-dependent creation and annihilation operators respectively in the Fock space  $\mathcal{H} = \bigoplus_{N=0}^{\infty} \mathcal{H}_N$  satisfying the canonical commutation relations

$$[\psi(x, t), \psi(y, t)] = 0, \quad [\psi(x, t), \psi^\dagger(y, t)] = \delta(x - y),$$

and such that  $\psi(x, t)$  annihilate the vacuum vector  $\Omega \in \mathcal{H}_0$ . This problem and its classical counterpart are discussed.

Reviewer: [Jiang Furu](#)

**MSC:**

[35J10](#) Schrödinger operator, Schrödinger equation

[81Q05](#) Closed and approximate solutions to the Schrödinger, Dirac, Klein-Gordon and other equations of quantum mechanics

[35A22](#) Transform methods (e.g., integral transforms) applied to PDEs

**Keywords:**

[inverse scattering transform](#); [quantum nonlinear Schrödinger equation](#)

**Full Text:** [DOI](#)

**References:**

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