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Scattering of the generalized Schrödinger cat state in a harmonic trap. The Wigner function approach.

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An isolated quantum system consisting of a single scattering barrier inside the potential well in the form of double harmonic oscillator is considered. The initial state is assumed to be the Schrödinger cat state [1] which is the superposition of two coherent states but generalized by additional parameter modelling a partial loss of interference which reflects the imperfection of the Schrödinger cat state preparation. The foregoing problem is considered within the phase space description of quantum mechanics, specifically the Wigner function approach. Time evolution of the considered system is given by the Moyal equation [2]. The major aim of the project is to investigate the dynamical characteristics of such quantum system and how they are affected by the imperfection of initial state preparation.

[1] Nicacio, Maia, Toscano and Vallejos. „Phase Space Structure of Generalized Gaussian Cat States.” *Phys. Lett. A* 374 (2010): 4385

[2] Cabrera, Bondar, Jacobs and Rabitz. „Efficient method to generate time evolution of the Wigner function for open quantum systems.” *Phys. Rev. A* 92 (2015): 042122

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