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Bose-Einstein condensate - Tunneling

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Bose-Einstein condensate is state of matter that is the future of the quantum computers. One of the crucial properties of Bose-Einstein condensate is quantum tunneling. In this paper are listed previously achieved results by other authors considering the factors that affect tunneling in Bose-Einstein condensate, such as form of interaction between particles, shape of potential well and the form and the dimension of the system [1]. According to Meng *et al.* who studied two-dimensional honeycomb optical lattice, tunneling occurs in an atractive interaction regime if dipole gap solitons are in-fase and in repulsive interaction regime if dipole gap solitons are out of phase [2]. If the particle experiences gradual change of potential barrier the probability of the excitation is lower [3]. If the particle experiences sudden change of the potential barrier, probability increases. [3] The further study of the factors that affect tunneling in Bose-Einstein condensate may be conducted in exploring different systems and mixtures of aforementioned condensates.

References

1. X. Zhao *et al.* , Phys. Rev. A **96**, (2017).
2. H. Meng *et al.*, Physica A: Stat. Mech. Appl. **577**, 126087 (2021).
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