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Quantum motion of a single photon in a nanofiber with randomly located quantum dots

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In the work within the framework of the gauge symmetry group SU(2)xU(1) the Yang-Mills equation for a single photon is considered. Using the equations in partial derivatives of the first order, an equation for the wave function of the photon is obtained in the form of an equation of the second order taking into account the random environment. The problem of the motion of a single photon in a nanofiber in which quantum dots are randomly located is considered as an important application. The problem of multiple elastic and inelastic scattering of a single photon on quantum dots is studied, as a result of which there is a probability of absorption of the photon by subsequent emission of two photons. The probabilities of the formation of entangled Bell states are studied in detail and their values are constructed in the form of integral representations.

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