



Particle with non-Abelian charge: classical and quantum

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We construct an action in the worldline formalism for a non-Abelian charged particle in a non-Abelian background field, described by real bosonic variables, leading to a set of the well known classical equations given by Wong. The isospin parts in the action can be viewed as the Lagrange multiplier term corresponding to a non-holonomic constraint restricting the isospins to be parallel transported. The path integration is performed over the isospin variables and their paths turn out to be constrained by its classical solution for the isospins.

We derive a wave equation from the path integral, constructed as the constrained Hamiltonian operator acts on the wave function. It reveals what operator ordering corresponds to our classical Hamiltonian. It is verified by the inverse Weyl transformation.

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