

Light-like path of anyon in magnetic field

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We consider the light-like trajectories of a massive relativistic anyon travelling in a uniform stationary magnetic field. We show that the classical particle paths are helical lines with the light-like tangent vector. The configuration of magnetic field determines the equations of motion for the symmetry axis of helix, while the step of helix is determined by spin. The deviation of the particle path from smooth propagation is explained by zitterbewegung phenomenon. We explicitly find the cyclotron frequency, and it is shown to be spin-dependent, even though spin has no physical degrees of freedom in 3d space-time. Computer simulation is used for visualization of particular trajectories.

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