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Transformation properties of electromagnetic field strength quantities under local gauge U(1) symmetry described in two-spinor language and induced Zitterbewegung (trembling motion) in spin 1/2 particles

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After a brief discussion about classical local U(1) Gauge invariance in Weyl two-spinor form and its origin, the local gauge transformation properties of the different components of the symmetric second order electromagnetic field spinor are analyzed. It is found that only the third component of the magnetic field is changed by local gauge transformations. By choosing an specific gauge it is shown that the phenomenon of Zitterbewegung (Trembling motion) is generated by a massless charge performing circular motion at the velocity of light.

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