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Very special relativity as particle in a gauge field and two-time physics

Abstract content

The action for a (3+1)-dimensional particle in very special relativity is studied. It is proved that massless particles only travel in effective (2+1)-dimensional space-time. It is remarkable that this action can be written as an action for a relativistic particle in a background gauge field and it is shown that this field causes the dimensional reduction. A new symmetry for this system is found. Furthermore, a general action with restored Lorentz symmetry is proposed for this system. It is shown that this new action contains very special relativity and two-time physics.

Summary

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