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Charges in an electromagnetic wave directed along a constant magnetic field: quantum and classical solutions¹ WILLIAM E. BAYLIS, RENAN CABRERA, Univ. Windsor, ON, Canada — Analytical quantum and classical solutions are derived for the relativistic dynamics of charges in classical electromagnetic fields. They are found to be closely related when the classical one is expressed in terms of spinors. This is the natural approach of the Clifford (or geometric) algebra of physical space. The field configurations explicitly treated include that of the autoresonant laser accelerator², and although the electromagnetic wave is taken to be a plane wave, it may be pulsed or continuous. The quantum solutions generalize solutions to the Dirac equation found by Bergou and Ehlotzky³ and by Volkov⁴.

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