Nolasco, Margherita
A normalized solitary wave solution of the Maxwell-Dirac equations. (English) Zbl 1475.49060
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Summary: We prove the existence of a $L^2$-normalized solitary wave solution for the Maxwell-Dirac equations in $(3+1)$-Minkowski space. In addition, for the Coulomb-Dirac model, describing fermions with attractive Coulomb interactions in the mean-field limit, we prove the existence of the (positive) energy minimizer.

MSC:
49S05 Variational principles of physics
81V10 Electromagnetic interaction; quantum electrodynamics
35Q60 PDEs in connection with optics and electromagnetic theory
35Q51 Soliton equations
49J20 Existence theories for optimal control problems involving partial differential equations

Keywords:
Maxwell-Dirac equations; solitary waves; variational methods

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