Bach, Volker; **Barbaroux, Jean-Marie**; **Helffer, Bernard**; **Siedentop, Heinz**

Stability of matter for the Hartree-Fock functional of the relativistic electron-positron field.

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Summary: We investigate stability of matter of the Hartree-Fock functional of the relativistic electron-positron field – in suitable second quantization – interacting via a second quantized Coulomb field and a classical magnetic field. We are able to show that stability holds for a range of nuclear charges $Z_1, \ldots, Z_K \leq Z$ and fine structure constants α that include the physical value of α and elements up to holmium ($Z = 67$).

MSC:

35Q40	PDEs in connection with quantum mechanics
81Q05	Closed and approximate solutions to the Schrödinger, Dirac, Klein-Gordon and other equations of quantum mechanics
81V10	Electromagnetic interaction; quantum electrodynamics

Keywords:

Dirac operator; generalized Hartree-Fock states; quantum electrodynamics; stability of matter

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