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The time-dependent, relativistic Aharonov-Bohm effect ZACHARY KERTZMAN, ATHANASIOS PETRIDIS, Drake University — It is known that the Aharonov-Bohm effect provides a definite proof that charged fermions couple directly to the 4-vector potential. Numerical, time-dependent solutions to the relativistic Dirac equation coupled with an external electromagnetic field are produced in order to study this phenomenon in detail. The staggered leap-frog method is used on a spatial lattice. The numerical stability of the method in two dimensions is a crucial issue. It is studied analytically and ensured by taking appropriately small time-steps. The action of the magnetic potential in the region of zero magnetic field is evaluated by means of the diffraction patterns it produces.

Athanasios Petridis
Drake University

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