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The relativistic time-dependent Aharonov-Bohm effect in two spatial dimensions ATHANASIOS PETRIDIS, ZACHARY KERTZMAN, Drake University — The Aharonov-Bohm (A-B) effect provides direct proof that the charged fermion fields are directly coupled to the gauge 4-vector potential. In this work the A-B effect is studied by means of the relativistic time-dependent Dirac equation coupled with static, external electromagnetic potentials. The staggered leap-frog numerical method is used and proven to be stable and accurate. The effect of possible residual Lorentz forces due to solenoid finite length is examined and compared to the pure A-B effect by means of the time-dependent interference patterns. The effect is also investigated inside quantum rings and shown to alter the fermion azimuthal probability distribution. There is a strong interaction A-B effect equivalent.

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