

Electromagnetic Horizons

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I consider the scattering of charged particles on particular electromagnetic fields which have properties analogous to gravitational horizons. Classically, particles become causally excluded from regions of spacetime beyond a null surface which I identify as an 'electromagnetic horizon'. In the quantum theory there is pair production at the horizon via the Schwinger effect, but only one particle from the pair escapes the field. Furthermore, unitarity appears to be violated when crossing the horizon, and there is no well-defined S-matrix. Despite this, the perturbative method can be used to construct 'amplitudes' which contain all the dynamical information required to construct observables related to pair creation, and to radiation from particles scattering on the background.