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Semiclassical Approximation for 1+1 Quantum Electrodynamics II: Validity of the Semiclassical Approximation[1] IAN NEWSOME, PAUL R. ANDERSON, ROBERT S. LINK, Wake Forest Univ, SILVIA PLA, JOSE NAVARRO-SALAS, Univ de Valencia — The validity of the semiclassical approximation in 1+1 quantum electrodynamics (QED) can be analyzed using a criterion which states the semiclassical approximation will break down if any linearized gauge invariant quantity constructed from solutions to the linear response equation grows rapidly for some time interval. A numerical solution to the linear response equation will be presented for the case of a quantized spin $\frac{1}{2}$ field coupled to a classical spatially homogeneous background electric field in 1+1 QED. This will be compared with two nearby solutions to the semiclassical backreaction equation whose difference acts as an approximate solution to the linear response equation. Special attention will be given to the critical scale for the Schwinger effect $E \sim E_{crit} = m^2/q$, as well as the extreme limits $q\,E/m^2 \ll 1$ and $q\,E/m^2 \gg 1$.

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Ian Newsome
Wake Forest Univ

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