Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Validity of the Semiclassical Approximation for Quantum Electrodynamics in 1+1 Dimensions. I[1] IAN NEWSOME, PAUL R. ANDERSON, ROBERT S. LINK, Wake Forest Univ, SILVIA PLA, JOSE NAVARRO-SALAS, Universidad de Valencia — A derivation of the linear response equations for quantum electrodynamics in 1+1 dimensions will be presented for the case of a spatially homogeneous electric field coupled to a quantized scalar field and a quantized fermion field. It will be shown that these equations depend upon the two point correlation function derived from the current-current commutator, $\langle[j(t,x), j(t',x')]\rangle$. A criterion for the validity of the semiclassical approximation will be given that involves the stability of solutions to the linear response equations. This is an adaptation of criteria previously used for the validity of the semiclassical approximation for gravity and that for the preheating phase of chaotic inflation. A method of finding approximate solutions to the linear response equations will also be given.

[1]This work was supported in part by National Science Foundation Grants No. PHY-1505875 and PHY-1912584 to Wake Forest University, and by Spanish Ministerio de Economia, Industria y Competitividad Grants. No. FIS2017-84440-C2-1-P and No. FIS2017-91161-EXP. S. P. is supported by a Ph.D. fellowship, Grant No. FPU16/05287.

Ian Newsome
Wake Forest Univ

Date submitted: 30 Dec 2019 Electronic form version 1.4