Numerical renormalization of infrared divergence for pair production in QED ETHAN GIBSON, SCOTT GLASGOW, DEVIN MCGHIE, JARED COLEMAN, Brigham Young University — We seek to resolve non-perturbative solutions to systems of pair-production in quantum electrodynamics (QED). We constrain our system to one spatial dimension, and examine the dressed vacuum state, compared with a system in which a photon decays into an electron-positron pair. We find that both systems encounter an Infrared (IR) divergence in their Hamiltonian. We describe photon momentum states using relativistic energy, assuming photon mass m_γ. By allowing photon mass to approach zero, we allow for regularization of the system. Using this regularization of photon mass, we obtain a numerical renormalization for pair production that we can use for further systems in pure QED.

Ethan Gibson
Brigham Young University