Asymptotic Completeness for Compton Scattering

Marcel Griesemer
University of Alabama at Birmingham

Scattering in a model of a massive quantum-mechanical particle, an "electron", interacting with massless, relativistic bosons, "photons", is studied. The interaction term in the Hamiltonian of our model describes emission and absorption of "photons" by the "electron"; but "electron" pair production is suppressed. An ultraviolet cutoff and an (arbitrarily small, but fixed) infrared cutoff are imposed on the interaction term. In a range of energies where the propagation speed of the dressed "electron" is strictly smaller than the speed of light, unitarity of the scattering matrix is proven, provided the coupling constant is small enough; (asymptotic completeness of Compton scattering). The proof combines a construction of dressed one–electron states with propagation estimates for the "electron" and the "photons".

Joint work with J. Froehlich and B. Schlein.