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Exploring the Quantum Limit for Surface Plasmon Polaritons DANIEL DOMINGUEZ, LUIS GRAVE DE PERALTA, Texas Tech University, QUANTUM OPTICS GROUP TEAM — This work explores the quantum limit of Surface Plasmon Polariton (SPP) generation based on Bohr's Correspondence Principle, i.e. that the quantum description of a phenomenon must converge to its classical counterpart in the limit of large numbers. Specifically, this work addresses the excitation and detection of single-photon SPPs. This is accomplished by first exploring whether SPPs can be excited using an extremely low intensity pump beam; and then by using Spontaneous Paramedic Down-Conversion (SPDC) as a source of single photons for SPP excitation. The granular effect of light is demonstrated by integrating the Hanbury Brown and Twiss experiment into the SPP detection scheme and measuring the degree of second order coherence of both the SPP excitation beam and the SPP leakage radiation. The results demonstrate that by using a beam of single photons as a source of excitation, one can indeed generate single-photon SPP's whose leakage radiation remains temporally spaced.

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