**Delbrück Scattering Calculation Using the LoopTools Package**

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Delbrück scattering involves the scattering of photons off the Coulomb field of atoms due to the creation of virtual electron-positron pairs from the vacuum [1]. The complexity of the cross section is such that calculations in the 1980’s took over one solar year to perform [2]. The next generation of high flux $\gamma$-ray sources from laser Compton scattering (LCS) have been proposed [3,4]. Although already measured [5], such sources will make possible much more precise measurement of Delbrück scattering. As a result, accurate numerical calculations are necessary for comparison with future experiments. We will present an outline of how to calculate the Delbrück scattering cross section using the LoopTools package of routines [6] designed for calculations of the loop integrals resulting from Feynman diagrams, which are involved in the Delbrück scattering (Figure), and some preliminary calculations.


One of the six lowest order Feynman diagrams for Delbrück scattering where $k,k'$ and $x$ are the incoming photon, outgoing photon and Coulomb field, respectively.