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(G*) Covariant Approach in Bethe-Heitler process for the calculation of electron-proton Scattering

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In order to search for the physics beyond the Standard Model at the precision frontier, it is sometimes essential to account for Next-to-Next-Leading Order (NNLO) corrections theoretical calculations. Using the covariant approach, we calculated the QED type leptonic tensor up to quadratic (one loop squared) NNLO (alpha cube) order, which can be used for the processes like (electron-proton) and (muon-proton) scattering relevant to MOLLER (background studies) and MUSE experiments, respectively. Recently we have used this approach for a hard photon bremsstrahlung process called "Bethe-Heitler". This is a 2->3 process where an electron scatters with a proton with the emission of a hard photon and is an important example in Quantum Electrodynamics (QED).
In this presentation, I will quickly review covariant approach and provide our latest results for quadratic QED electron-proton scattering along with the Bethe-Heitler process.

Keyword-1

electron-proton Scattering

Keyword-2

Covariant Approach

Keyword-3

Bethe-Heitler process

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