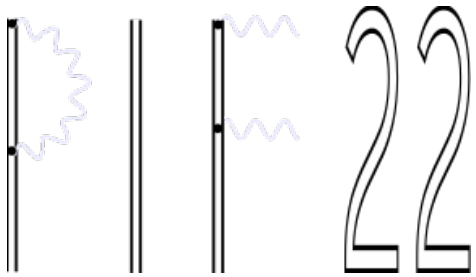

Contribution ID: **21** Type: **not specified**

Euler-Heisenberg Lagrangian with axial gauge

Wednesday 31 August 2022 11:05 (25 minutes)

The Euler-Heisenberg Lagrangian is discussed in homogeneous electromagnetic fields with a constant axial gauge coupling, to one-loop order. Two special configurations, namely a magnetic field with chiral chemical potential as well as an electric field with spatial axial gauge, are argued to possess an exact eigenspectrum, whose sum leads to a defining Lagrangian.

In the case of an electric field, it is shown that the addition of a spatial axial gauge leads to an enhancement of pair production. The imaginary part of the Lagrangian is also examined using the worldline formalism where it is demonstrated the axial gauge acts as a negative mass shift for helicity aligned eigenstates, leading to the enhancement. Finally, the massless case is discussed, whose form is exact at one-loop by virtue of the Fujikawa method.

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Session Classification: Strong Field QED

Track Classification: Strong-field QED: Schwinger effect