

# New exact wavefunctions and generic 2-vertex processes, in two strong electromagnetic fields

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In future linear colliders, ultrarelativistic charge bunches with associated electromagnetic fields approaching or exceeding the Schwinger limit, will interact at the IP. With such strong fields, vacuum polarisation becomes significant and, in order to quantify the effect on physics processes, new analytic calculations in the Furry interaction picture are necessary. Up to now, Furry picture calculations - most notably the beamstrahlung, only consider one external field, that of the oncoming bunch. However, for particles with significant transverse momentum, there is potentially an effect from both bunch fields. To that end we present here new solutions of the equations of motion obtained from the Furry picture Lagrangian for the exact interaction with the two electromagnetic fields associated with each interacting charge bunch. These enable more physically correct cross-section calculations to be performed.

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