

Towards the exact calculation of strong field effects on polarized particles at future linear colliders

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Future linear colliders will collide very dense charge bunches which exhibit strong electromagnetic fields which noticeably affect physics processes. The most obvious example is depolarisation at the IP which is made up of a number of strong field processes and which varies from 0.22% (ILC) to 5% (CLIC). The transition probabilities of these processes are calculated using an approximation which requires all particle momenta ultra-relativistic and anti-collinear to the oncoming field. This is not the case for beams with a crossing angle, for integrations over all final particle momenta and for particle propagators. In the interests of precision calculations, new solutions of the Dirac equation in the fields of both charge bunches are obtained and employed to recalculate various transition probabilities. The effect on the beamstrahlung and the depolarisation is discussed.

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