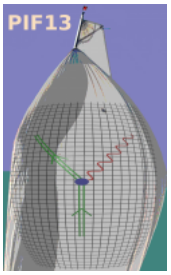

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Future linear colliders: an opportunity to study strong field QED

Thursday 11 July 2013 10:00 (20 minutes)

Future linear colliders will collide dense charge bunches generating
very intense electromagnetic fields at the IP, often approaching or even exceeding the Schwinger critical field in the rest frame of the
ultrarelativistic colliding particles. These strong fields affect all the processes happening at the IP, in particular, at 1st order, beamstrahlung and coherent pair production.
The dense beams at the LC offer another opportunity to test strong field/nonlinear QED and a whole range of further predicted phenomena.
We propose an experiment that will focus an intense laser on the LC electron beam post-IP.
High energy electrons then undergo vacuum polarization effects when the field strength approaches the Schwinger critical field.
Previously similar experiments at SLAC E144 have investigated nonlinear
Compton scattering, Breit-Wheeler pair production and electron mass shift using an electron beam of 46.6 GeV; the higher and intense beam energies at the next LC would allow more precise studies of these phenomena.
We also plan to test for the first time the radiative transitions between Zel'dovich electron quasi-levels in a laser.

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