LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE

Séminaire LAL

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Mardi 14 mai 2019 à 11h00

Nonperturbative QED tests at electron/laser facilities

A near head on collision between relativistic electrons and an intense laser allows the field strength in the rest frame of the electron to reach an appreciable fraction of the Schwinger critical field. This sets the scale for nonperturbative effects like field dependent vacuum polarisation, Schwinger pair creation and resonant transitions from ordered vacuum states. I will review the non perturbative theory, the novel particle processes that result, and the prospects for experimental tests at facilties in the near term. At the LUXE experiment at EuXFEL, 17.5 GeV electrons will interact with an optical laser of intensity $a_0\approx 1-5$. Nonlinear pair production results with the assistance of multiphoton contributions from the laser, and the Schwnger critical field is planned to be measured. At more modest electron energies, nonlinear Compton scattering can be studied along with rare resonant processes induced via the assistance of a probe laser, in addition to the primary one.

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