Design of a single-particle detection system for strong-field QED experiments

Salgado, Felipe Cezar

One of the most intriguing physics processes that remain untested is the pure photon electron-positron pair production via quantum-vacuum fluctuations described by the nonlinear Breit-Wheeler theory. These fluctuations generate virtual pairs that can be turned into observable particles by applying strong electric fields above the Schwinger critical limit of \num{1.3d18}~V/m~\cite{Schwinger.1951, Ritus.1985}. Despite the advent of high-intense lasers, the critical limit is still far beyond achievable. However, such fields can be achieved on the rest frame of the real particles after the collision of a high-energy γ-ray photons with the laser beam. To diagnose the created pairs, this thesis describes the design of a parti-

Category

Reviewer: Zepf, Matthäus; Norreys, Peter; Dromey, Brendan

Date accepted: 26.01.2023

Date Issued: 2023

URN: urn:nbn:de:gbv:27-dbt-20230216-133236-008

PPN: 1836340265

Language: English

Type of Resource: Text

Extent: 187 Seiten

Place Term: Jena

Keywords: Strong-Field QED • Breit-Wheeler Pair Production • Single-Particle • Detector • Quantum-Vacuum

DDC subject of DNB: 530 Physics

Dissertation note: Dissertation, Friedrich-Schiller-Universität Jena, 2023

+ add to list | Actions

Cite

Citation style:

Elsevier - Harvard (with titles)

Salgado, F.C., 2023. Design of a single-particle detection system for strong-field QED experiments. Jena.

Rights

Export

BibTeX, Endnote, MODS, MARCXML, RIS, ISI, PICA, DC, CSV