



Contribution ID: 39

Type: **not specified**

Strong field QED in crystals

Monday 29 August 2022 15:05 (25 minutes)

Utilizing the relativistic invariance of the parameter $\chi = \gamma E/E_0$, ultrarelativistic particles in strong crystalline fields of the order 10^{11} V/cm enable investigations of processes in fields of the order the QED critical field $E_0 = m^2 c^3 / e \hbar = 1.32 \cdot 10^{16}$ V/cm (with a corresponding magnetic field of $B_0 = 4.41 \cdot 10^9$ T) in the particle rest frame. In the framework of the CERN NA63 experiment we have obtained experimental results on e.g. quantum synchrotron radiation emission, coherent pairs, radiation reaction and recently trident production in such fields. An overview of results from the CERN NA63 experiment is presented.

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Session Classification: Experiment

Track Classification: Experiments and facilities: Experiments