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PS1-03: Single Photon Annihilation of Positrons in the Channeling Regime

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It is well known that the energy and momentum conservation laws forbid positron-electron annihilation, producing the single photon only. It can produce two photons in vacuum, or the process is possible with a participation of the third body.

The situation can be essentially changed in a single crystal when one or the both leptons are moving in the channeling regime when the transverse motion of a particle is bound. It appears the possibility of the single photon positron-electron annihilation process, described by the Feynman diagram with the single vertex only. In this report we analyze the different configurations of the single photon positron-electron annihilation process when one or the both leptons are in channeling regime and outline the conditions when the one-photon process may be a source of the high energy gamma-radiation.

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