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Ionization Effect From Ultra Relativistic Electron-Positron Pair in Thin Plate

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In the present work the theory of ultra relativistic electron-positron pair ionization loss in thin plate, situated on different distances from the substance in which the pair is created (which corresponds to the experimental situation of [1]) is developed. It is shown that in this case the transition radiation which occurs during the pair emission from substance may significantly influence upon the pair ionization loss in thin plate. In this case the effect of pair ionization loss reduction takes place on much larger distance from the pair creation point than in infinite medium. Moreover it shown that in this case the effect opposite to the one of Chudakov may occur, which means that the pair ionization loss in plate may exceed the sum of separated electron and positron losses. The conditions for manifestation of such effect are discussed.

[1] T. Virkus, H.D. Thomsen, E. Uggerhoj et al., Phys. Rev. Lett. 100 (2008) 164802

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