

# Effect of Radiation Reaction on Collective Processes in Collision of High-Current Ultrarelativistic Beams of Particles

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The effect of energy loss due to synchrotron radiation in the collision of high-current beams of ultrarelativistic particles on their disruption is studied. Due to a decrease of the inertia of the particles, the effective frequency of betatron oscillations of the particles of one beam in the field of the opposite beam increases significantly, which leads to a more rapid disruption of the beams, *i.e.* a significant change of the beams parameters such as diameter, luminosity, *etc.* An analytical estimate for the radiation reaction corrected disruption parameter as a function of the beam parameters is derived. The validity of the obtained estimate is confirmed via the results of full-scale three-dimensional particle-in-cell simulations with quantum electrodynamic effects taken into account.

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