

The friction in a system of relativistic charged particles

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A system consisting of a large number of relativistic charged particles is considered. An expression for the friction coefficient in momentum space has been derived based on particle dynamics under the action of the total force of binary interaction between charged particles. The derived formulas determine the particle friction coefficients in momentum space, both during the kinetic stage of the system's evolution at some preceding moment of time for the pre-Brownian particle motion. General equations are used to derive the friction coefficient for collisions between relativistic charged particles of different types. We investigated radiation friction in a system of charged particles acting as emitters. The motion of a stream of relativistic charged particles in an external periodic field and the interaction of the particles via the electromagnetic fields of their spontaneous radiation are considered. Expressions have been obtained for the longitudinal momentum-space friction coefficient of particles for time intervals shorter than the particle motion randomization time and for time intervals longer than the randomization time, when the particle motion is completely random.

Primary author: OGNIVENKO, Volodymyr (National Science Center Kharkiv Institute of Physics and Technology)

Presenter: OGNIVENKO, Volodymyr (National Science Center Kharkiv Institute of Physics and Technology)

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