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Collisional plasma relaxation in the field of a planar gravitational wave

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Abstract

The general relativistic kinetic theory is applied to calculate corrections to the distribution arising from Coulomb collisions of particles in the field of a planar gravitational wave. These corrections are used in corrections to the energy-momentum tensor and in deriving the collisional-damping decrements for gravitational waves for a Boltzmann plasma and for a plasma with degenerate electrons. The largest contribution to the damping decrement in a Boltzmann plasma comes from the ions colliding with the electrons; the decrement increases as T-1/2. In a plasma with degenerate electrons, the decrement decreases linearly as the temperature falls and tends to zero at zero temperature. © 1983 Plenum Publishing Corporation.

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