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On the characteristics of the Cherenkov and Ohm forces

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Abstract

The wake field generated by a moving charge in the vicinity of a non-magnetic material is examined in terms of the decelerating reaction force. Two main cases are investigated – the Cherenkov and Ohm effects. In the first case we examine the force which results from the Cherenkov radiation emitted as the charge moves in the vicinity of a lossless dielectric medium; in the second – the decelerating force is a direct result of power dissipated by excited currents on the surrounding lossy wall. In both cases, for highly relativistic particles the force is independent of the particle's energy.