

Brownian Motion of a Test Particle with a Normal Classical Velocity in Spacetime with a Plane Boundary

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Abstract: We study the random motion of a charged test particle with a normal classical constant velocity in a spacetime with a perfectly reflecting plane boundary and calculate both the velocity and position dispersions of the test particle. Our results show that the dispersions in the normal direction are weakened while those in the parallel directions are strengthened as compared to the classical static case when the test particle classically moves away from the boundary. However, if the classical motion reverses its direction, then the dispersions in the normal direction are reinforced while those in the parallel directions get weakened.

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