

A Relativistic Zeno Effect

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Abstract

A Zenonian supertask involving an infinite number of identical colliding balls is generalized to include balls with different masses. Under the restriction that the total mass of all the balls is finite, classical mechanics leads to velocities that have no upper limit. Relativistic mechanics results in velocities bounded by that of light, but energy and momentum are not conserved, implying indeterminism. By entertaining the possibility that the missing energy and momentum are carried away by a photon, however, one can restore the conservation laws and determinism.

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