

# NEXT-TIME QUESTION

CONCEPTUAL Physics



Electronics types don't take the force of gravity into account when calculating the trajectories of electrons in CRT tubes and the like. Why not?



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## NEXT-TIME QUESTION

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Answer:

Electronics engineers don't take the force of gravity into account only because of the small times involved with the customary short distances of electron trajectories. The electrons fall the same distances that baseballs would fall in the same time interval. The small mass of electrons doesn't alter the gravitational acceleration they experience— $g$ . Even in the 2-mile long electron tube at the Stanford Linear Accelerator, for example, electrons complete their trip in less than  $10^{-5}$  second, which at  $9.8 \text{ m/s}^2$  finds them only  $5 \times 10^{-10} \text{ m}$  (a few atomic diameters) below the straight-line path they would take without gravity. Gravitational acceleration  $g$  is still there—it's just that the time it acts is so small.