

Answer on Question #43080, Physics, Quantum Mechanics

Why Heisenberg's uncertainty principle is insignificant for macroscopic particles such as moving car or ball?

Solution:

Mathematically we describe the uncertainty principle as the following, where 'x' is position and 'p' is momentum:

$$\Delta x \Delta p > \frac{h}{2\pi}$$

It basically says that the combination of the error in position times the error in momentum must always be greater than Planck's constant. So, you can measure the position of an electron to some accuracy, but then its momentum will be inside a very large range of values. Likewise, you can measure the momentum precisely, but then its position is unknown.

The uncertainty principle is unimportant to macroscopic objects since Planck's constant, h , is so small ($h = 6.63 \cdot 10^{-34}$ J·s). For example, the uncertainty in position of a thrown ball is 10^{-30} millimeters. This value is pretty much impossible to detect, because is much smaller than any currently measurable sizes.

<http://www.AssignmentExpert.com/>