Question:

A proton is Accerlarated to one - tenth of the velocity of light.suppose its velocity can be measured with a precision of +- 1% ,what must be the uncertainty in its position (in nm) (mass of proton= 1.673×10^-27)

Solution:

Velocity = $3*10^8/10 = 3*10^7$ m/sec;

$\Delta V = V*1/100 = 3*10^5$;

$\Delta x = h/4\pi m\Delta V = 6.626*10^{-34}/(4\pi*1.673*10^{-27}*3*10^5) = 1.05*10^{-13}$m.

Answer: $1.05*10^{-13}$m.