We are now ready to compute $p_\perp$ and $p_\parallel$:

35 cont. 5/7

$p_\perp = 191\, B R$

$B = 9 \times 10^{3}$ gauss $= .9$ Weber/meter^2 $= .9$ Tesla

$e = 1.602 \times 10^{-19}$ coulomb

$R = 4.831$ cm $= 4.831 \times 10^{-2}$ meters

$p_\perp = (1.602)(.9)(4.831) \times 10^{-21}$

$$\boxed{p_\perp = 6.95 \times 10^{-21} \ \frac{\text{kg meter}}{\text{sec}}}$$

Next find $p_\parallel$:

$$p_\parallel = \frac{q B \Delta z}{2\pi}$$ where Δz = distance moved in one complete turn

$\frac{\Delta z}{2\pi}$ = distance moved/radian

.217 radians $\Rightarrow$ $\delta z = 3.1 - 1.9 = 1.2$ cm

$\therefore$ 1 radian $\Rightarrow$ $\delta z = \frac{1.2}{.217} = 5.53$ cm

$\therefore$ $\frac{\Delta z}{2\pi} = 5.53$ cm $\Rightarrow$ $p_\parallel = (1.602)(.9)(5.53) \times 10^{-21}$

$$\boxed{p_\parallel = 7.97 \times 10^{-21} \ \frac{\text{kg meter}}{\text{sec}}}$$