

2001 Part II Q4

GPII

Parts (a), (b) easy

(c)

(d) The electrons and ions are confined for approximately the same amount of time - that is the ambipolarity condition. Since ions pitch angle scatter more slowly than electrons, an ambipolar potential develops to confine electrons and repel ions. Thus the confinement time is approximately the ion pitch angle scattering time

$$\tau_{ii} \sim \frac{1}{\nu_{ii}}$$

or more accurately $\tau \approx \tau_{ii} \log R$