gradB:

$$ec{v} = -\{B_z + rac{mc}{q}(rac{cE_A\sin\{2\pi(rac{t}{T} - rac{R_0 heta}{\lambda}) + rac{\pi}{2}\}}{B_z^2}\xi_r)\}^{-1}(E_A\sin\{2\pi(rac{t}{T} - rac{R_0 heta}{\lambda}) + rac{\pi}{2}\} - rac{\mu}{q}\xi_r + rac{mc^2}{q}rac{(E_A\sin\{2\pi(rac{t}{T} - rac{R_0 heta}{\lambda}) + rac{\pi}{2}\})^2\xi_r}{B_z^2})ec{e_ heta}$$

so,
$$v_{grad}=rac{1}{B_z}rac{\mu}{q}\xi_r$$

assumption $B_z=rac{B_E}{L^3}$ (in magnetic equator) , $B_E=3.11 imes10^{-5}{
m T}=3.11 imes10^{-1}{
m G}$ if L=6, $B_z=1.4 imes10^{-7}{
m T}=1.4 imes10^{-3}{
m G}$

$$\mu = rac{mv_{\perp}^2}{2B_z} = rac{(9.1 imes 10^{-28} ext{g}) imes (3.0 imes 10^8 ext{cm/s})^2}{2.0 imes 1.4 imes 10^{-3} ext{G}}$$

$$\xi_r = rac{\partial B_z}{\partial r} = rac{\partial B_z}{\partial L} rac{\partial L}{\partial r} = -3 rac{B_E}{L^4} rac{1}{R_0} = rac{-3 imes 3.1 imes 10^{-1}
m G}{6^4 imes 6 imes 10^8
m cm}$$

$$v_{grad} = rac{1}{B_z} rac{\mu}{q} \xi_r = rac{1}{1.4 imes 10^{-3} ext{G}} imes rac{1}{4.8 imes 10^{-10} ext{statC}} imes rac{(9.1 imes 10^{-28} ext{g}) imes (3.0 imes 10^8 ext{cm/s})^2}{2.0 imes 1.4 imes 10^{-3} ext{G}} imes rac{-3 imes 3.1 imes 10^{-1} ext{G}}{6^4 imes 6 imes 10^8 ext{cm}}$$

$$v_{grad} = -rac{9.1 imes3.0 imes3.0 imes3.1}{1.4 imes4.8 imes2.0 imes1.4 imes6^4 imes6}10^{-5} {
m cm}/s$$