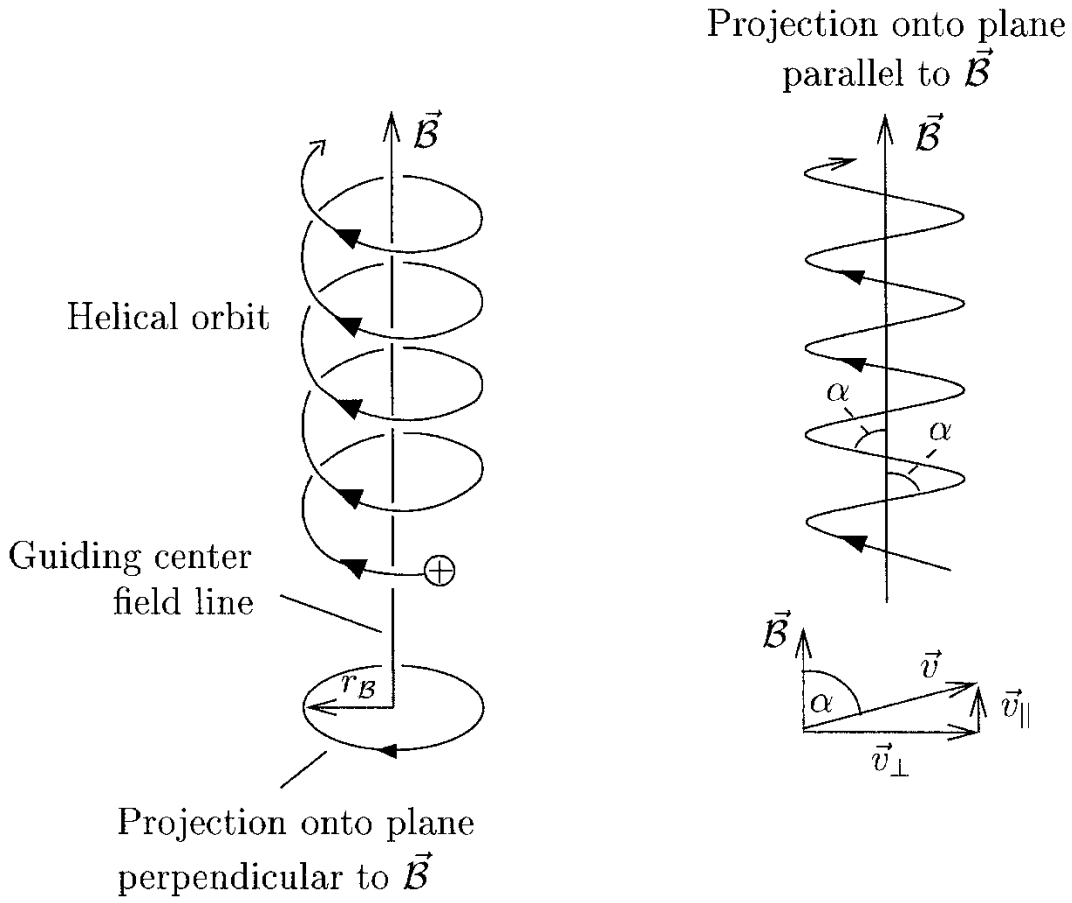
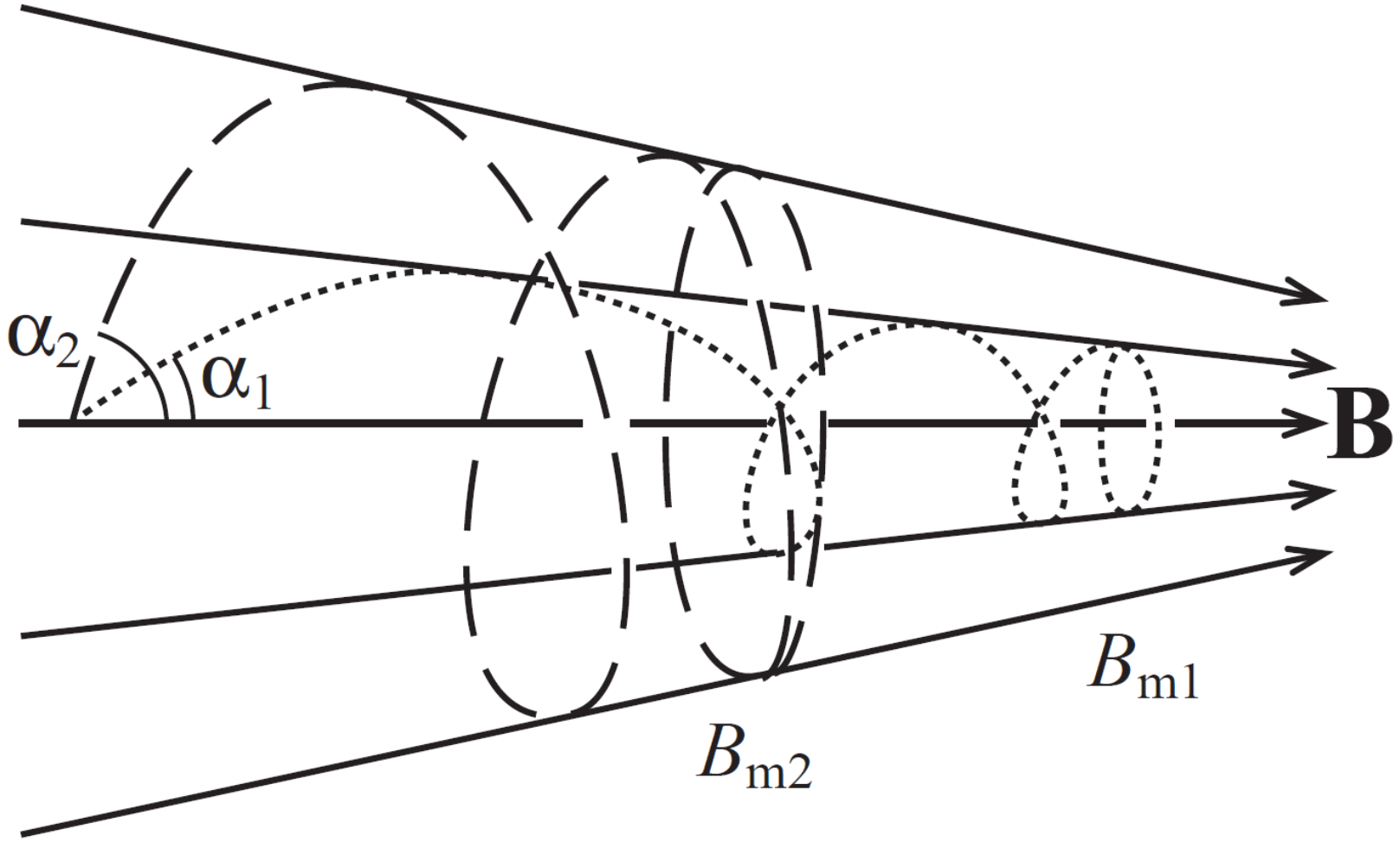
Gyration

$v_{\parallel} \neq 0$



Magnetic mirror/loss cone



Single particle drifts

E×B Drift:

$$\mathbf{v}_E = \frac{\mathbf{E} \times \mathbf{B}}{B^2}$$

Polarization Drift:

$$\mathbf{v}_P = \frac{1}{\omega_g B} \frac{d\mathbf{E}_\perp}{dt} \qquad \mathbf{j}_P = \frac{n_e(m_i + m_e)}{B^2} \frac{d\mathbf{E}_\perp}{dt}$$

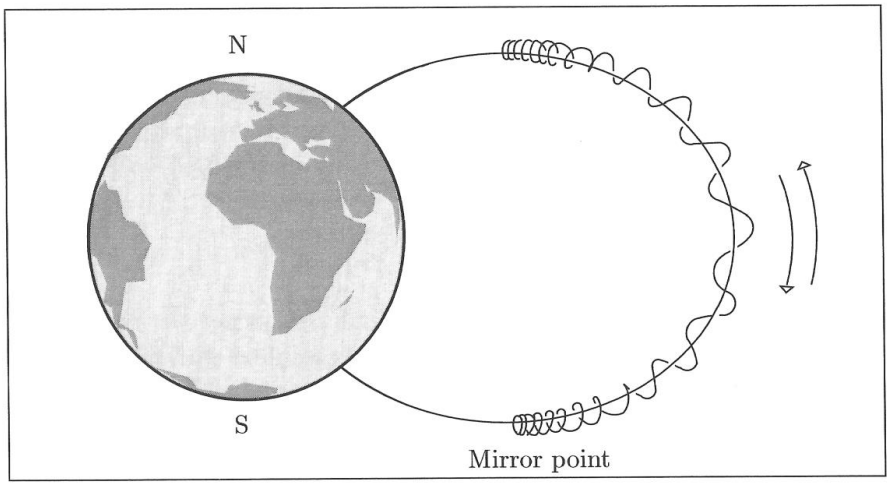
Gradient Drift:

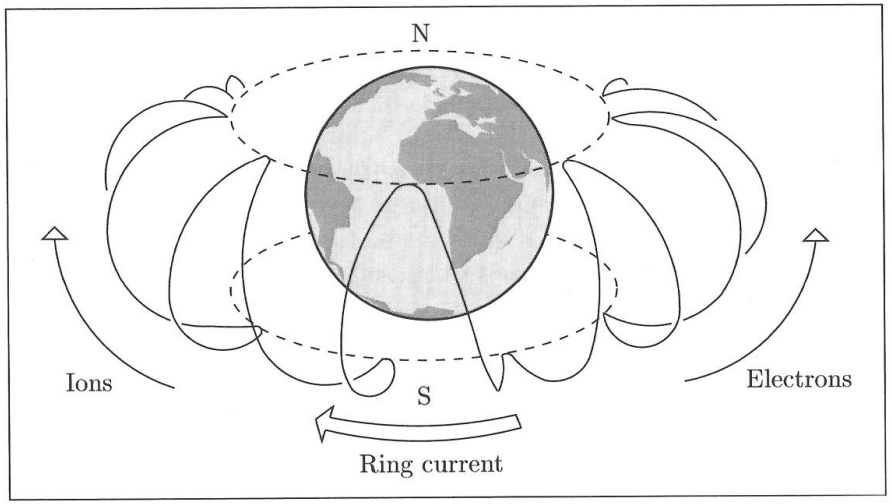
$$\mathbf{v}_\nabla = \frac{m v_\perp^2}{2q B^3} (\mathbf{B} \times \nabla B) \qquad \mathbf{j}_\nabla = \frac{n_e(\mu_i + \mu_e)}{B^2} (\mathbf{B} \times \nabla B)$$

Curvature Drift:

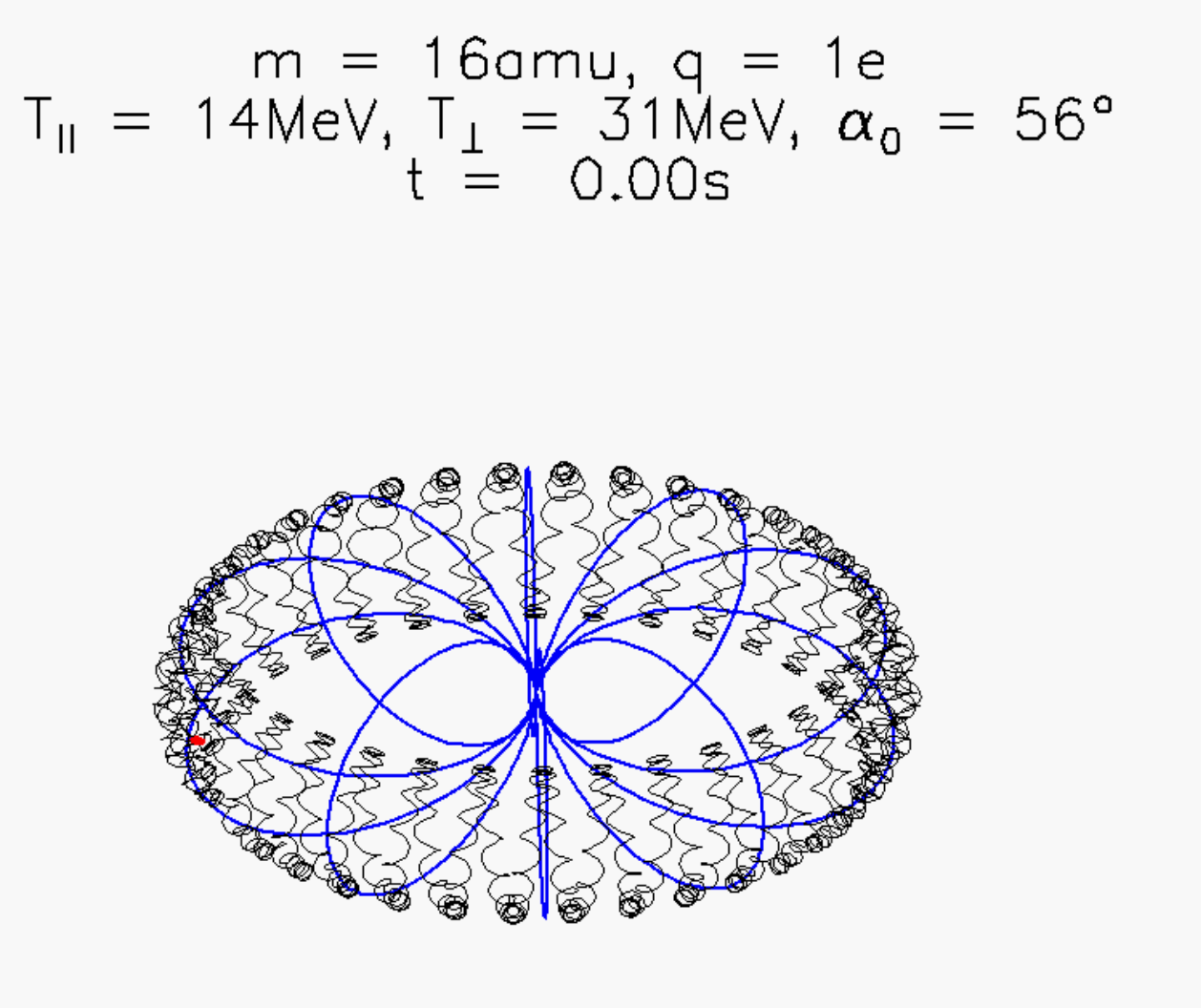
$$\mathbf{v}_R = \frac{m v_\parallel^2}{q R_c^2 B^2} (\mathbf{R}_c \times \mathbf{B}) \qquad \mathbf{j}_R = \frac{2n_e(W_{i\parallel} + W_{e\parallel})}{R_c^2 B^2} (\mathbf{R}_c \times \mathbf{B})$$

Bounce and drift motion

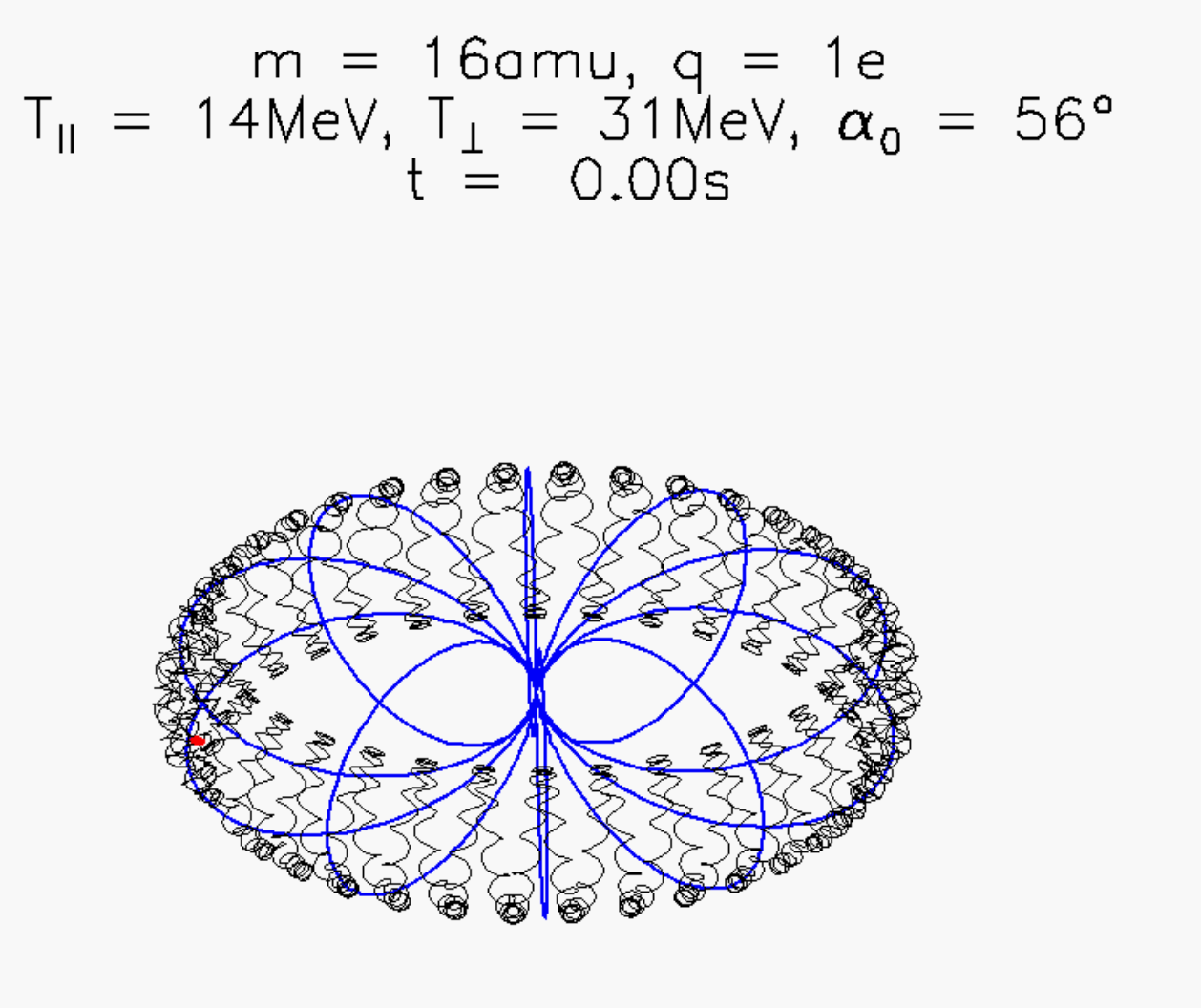




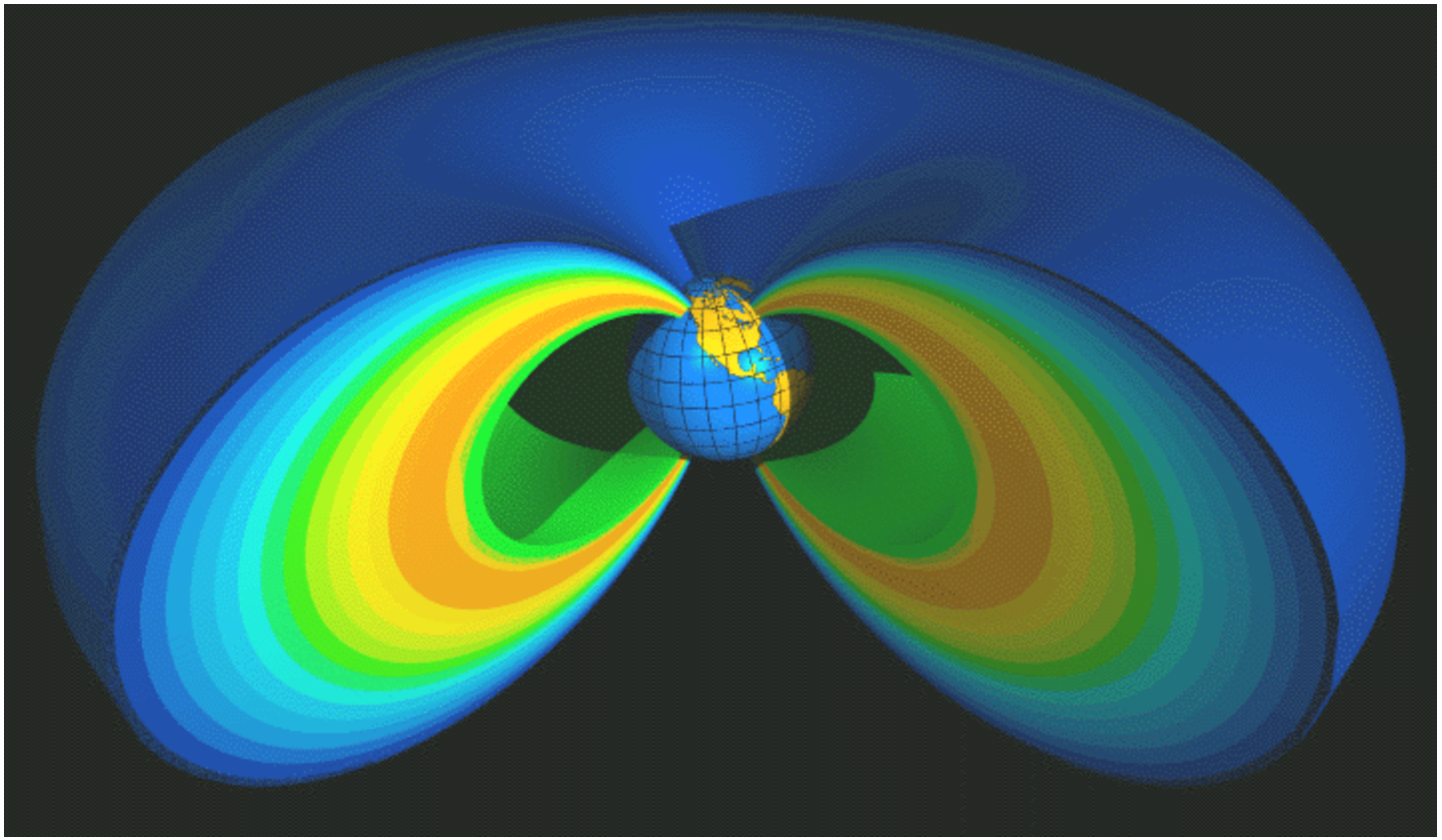
Single particle motion in dipole field



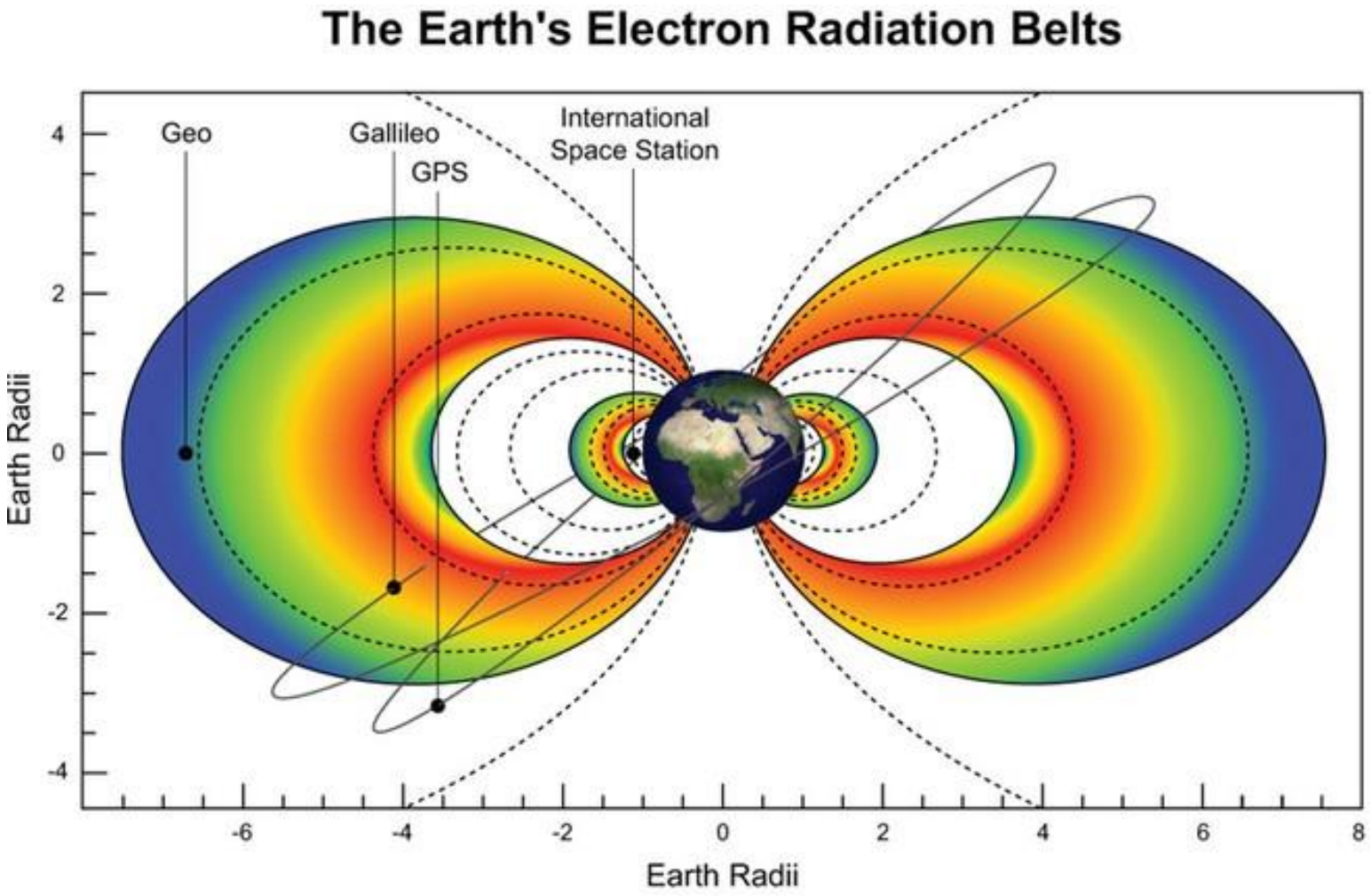
Single particle motion in dipole field



Radiation belts



Space weather relevance



Ring current