1. $\mu = IA$, $I = q\frac{\Omega}{2\pi} = \frac{q^2B}{2\pi m}$, $A = \pi r^2 = \pi \frac{m^2 v_\perp^2}{q^2B^2}$. ($r = \frac{mv_\perp}{qB}$)

$= \frac{W_\perp}{B}$. $W_\perp = \frac{1}{2}mv_\perp^2$ 横向动能. ①

$dW_\perp = qE \cdot dr_\perp$, $dr_\perp = v_\perp dt$.

回旋一周: $\Delta W_\perp = \int_0^{2\pi/\Omega_c} qE \cdot v_\perp dt$

由于磁场缓变, 所以 $\Delta W_\perp \approx q \oint_L E \cdot dl = q \iint_S (\nabla \times E) \cdot ds = -q \iint_S \frac{\partial B}{\partial t} \cdot ds$.

$\rightarrow \Delta W_\perp = q \cdot \pi r^2 \frac{dB}{dt}$.

$\frac{dW_\perp}{dt} \approx \frac{\Delta W_\perp}{T}$, $T = \frac{2\pi r}{v_\perp} = \frac{2\pi m}{qB}$.

$\approx \frac{mv_\perp^2}{2B}\frac{dB}{dt} = \mu \frac{dB}{dt}$. ②

由①式: $dW_\perp = B\frac{d\mu}{dt} + \mu \frac{dB}{dt}$. ③.

由②, ③式: $\frac{d\mu}{dt} = 0$.