

The atoms absorb an ELF energy $U=\eta P_a /f$, where η is a particle-dependent absorption coefficient and P_a is the incident radiation power on the atom ; $P_a=DS_a$ where S_a is the atom's *geometric* cross section and $D=P/S$ the radiation power density on the atom. Thus ,

$$U= \eta DS_a /f \quad (1)$$

By substituting this equation in Eq(1.05) , we will have

$$m_g = m_a - 2 \left\{ \sqrt{1 + \left[\frac{\eta DS_a}{m_a c^2} \sqrt{\frac{c^2 \mu_{body} \sigma_{body}}{4\pi f^3}} \right]^2} - 1 \right\} m_a \quad (2)$$

We then see that m_g DEPENDS ON f^{-3} .This is the GENERAL CASE.

However, IN PARTICULAR CASE where the radiation source is a short dipole encapsuled with a material (μ_p, σ_p) it can be easily show that

$$U = \eta DS_a / f = \frac{2\eta S_a (I_0 z_0)^2}{3\sigma_p S \omega} (\frac{1}{2} \mu_p \sigma_p \omega)^{3/2} \quad (3)$$

Thus, if the material which absorbs the ELFradiation has (μ_i, σ_i).Then equation (1.05) gives,

$$m_g = m_a - 2 \{ [1 + (2\eta S_a / 3S m_a c)^2 (\mu_i \sigma_i \sigma_p / 2) (\mu_p / 2)^3 (z_0)^4 I_0^4]^{1/2} - 1 \} m_a$$

which is independent of the frequency.