$$\frac{\cancel{z}\cancel{e} b\gamma}{\sqrt{2\pi}}\int_{-\infty}^{+\infty}\frac{e^{i\omega t}\,dt}{(b^2+\gamma^2 v^2 t^2)^{3/2}} = \frac{\cancel{z}\cancel{e}}{\cancel{b}v}\left(\frac{2}{\pi}\right)^{1/2}\frac{\omega \cancel{b}}{\gamma v}K_1\left(\frac{\omega b}{\gamma v}\right)$$

$$= \sqrt{\frac{2}{\cancel{\pi}}}\,\frac{\omega}{\gamma v^2}K_1\left(\frac{\omega b}{\gamma v}\right)$$

$$\Rightarrow K_1\left(\frac{\omega b}{\gamma v}\right) = \frac{b\gamma\cdot\gamma v^2}{2\omega}\int_{-\infty}^{+\infty}\frac{e^{i\omega t}\,dt}{(b^2+\gamma^2 v^2 t^2)^{3/2}}$$

$t\to K_\parallel \quad b\to\sqrt{y^2+|z-b|^2}$

$\omega\to R$

$$\vec{E}\cdot(\hat{y}+\hat{z}) = -\frac{2e\omega}{v^2\varepsilon}K_1\left(\frac{\omega}{v}b\right)$$

$(\gamma=1)$

$$= -\frac{\cancel{2}e\cancel{\omega}}{\cancel{v^2}\varepsilon}\cdot\frac{b\,\cancel{v^2}}{\cancel{2\omega}}\int_{-\infty}^{+\infty}\frac{e^{i\omega t}\,dt}{(b^2+\gamma^2 v^2 t^2)^{3/2}} = -\frac{eb}{\varepsilon}\int_{-\infty}^{+\infty}\frac{e^{i\omega t}\,dt}{(b^2+\gamma^2 v^2 t^2)^{3/2}}$$

$$= -\frac{eb}{\varepsilon}\int\frac{e^{iK_\parallel R}\,dK_\parallel}{\left(v^2K_\parallel^2+y^2+|z-b|^2\right)^{3/2}}$$

$\bar{K}_\parallel = \left(\frac{\omega}{v}, K_y\right)$

$$\frac{[e]\,[\omega]}{[v^2]} = \frac{[e]}{\cancel{T}L^2}\cdot T^{\cancel{2}} = [e]\cdot\frac{T}{L^2}$$

OK

$$\frac{[e]}{[v]}\cdot\frac{\cancel{[k]}}{\cancel{[k]}}[k] = [e]\cdot\frac{T}{L}\cdot\frac{1}{L} = [e]\frac{T}{L^2}$$

$\boxed{E_e = -\bar{\nabla}\phi_e}$ where ϕ_e: $\bar{K}_\parallel = (K_x, K_y)$ $\quad K_z \approx iK_\parallel$

. . .

$\bar{r}_e(t) = (vt, 0, b)$

$$\boxed{\phi_e^{(\omega)} = -e\int dt\,\frac{e^{i\omega t}}{|\bar{r}-\bar{r}_e(t)|}}$$

$\bar{R}_e(t) = (vt, 0)$

$z_e = b$

$$= -e\int dt\,e^{i\omega t}\,\frac{d^2\bar{K}_\parallel}{2\pi K}\,e^{i\bar{K}\cdot(\bar{R}-\bar{R}_e)-iK_z|z-z_e|}$$

$$\boxed{E_e^{dir} = -\bar{\nabla}\phi_e = e\int\frac{dK_\parallel}{K_\parallel}\cdots}$$

$\underline{\bar{E}_e^{tot}(\bar{r})}$

$\underline{\bar{E}_e^{tot}(\bar{r}_D)}$

$\bar{R}_e = (0,0)$

$\underline{e^{i\bar{K}_\parallel\cdot(\bar{R}_D-\bar{R}_e)}\,e^{-K_\parallel|z-b|}}$

$\bar{r}_D, \bar{r}_e$

$\bar{\nabla}$

$\bar{r} = (\bar{R}, z)$