

1) SUMMARY, 23rd June 2006

THE RESONANT COULOMB LAW

Γ_L are dimensionless (z):

$$\frac{d^2 \phi}{dz^2} + \frac{1}{z} \frac{d\phi}{dz} - \frac{\phi}{z^2} = -\frac{f_0}{\epsilon_0} \cos(\kappa z) \quad - (1)$$

Using Euler method this reduces to:

$$\frac{d^2 \phi}{dz^2} + \kappa^2 \phi = \frac{f_0}{\epsilon_0} \operatorname{Real} \left(e^{2i\kappa z} \cos(e^{i\kappa z}) \right) \quad - (2)$$

where:

$$\begin{aligned} & \operatorname{Real} \left(e^{2i\kappa z} \cos(e^{i\kappa z}) \right) \\ &= \cos(2\kappa z) \cos(\cos(\kappa z)) \cosh(\sin(\kappa z)) \\ &+ \sin(2\kappa z) \sin(\cos(\kappa z)) \sinh(\sin(\kappa z)) \quad - (3) \end{aligned}$$

These equations have been checked for analytical correctness and eq. (2) has been solved numerically by Dr. Horst Eckardt of Siemens Company in Munich.