DOUBLE DIPOLE ANTENNA SOLUTION

Set up two dipole antennae **equal and opposite**:

$$A_1 = -i\frac{\kappa e^{i\kappa r}}{4\pi c\varepsilon_0 r}p_1 \tag{1}$$

$$A_2 = i\frac{\kappa e^{i\kappa r}}{4\pi c\varepsilon_0 r}p_2 \tag{2}$$

where $\boldsymbol{p}_1$ and $\boldsymbol{p}_2$ are the dipole moments, r is the radius vector and κ is the wave-vector.

Then

$$\begin{aligned} \boldsymbol{A} &= \boldsymbol{A}_1 + \boldsymbol{A}_2 = \boldsymbol{0} \\ \boldsymbol{E} &= \boldsymbol{B} = \boldsymbol{0} \end{aligned} \tag{3}$$

and

$$\dot{f}_1 = -\dot{f}_2; \qquad g_1 = -g_2 \tag{4}$$

$$\dot{F}_1^2 = \dot{F}_2^2; \qquad G_1^2 = G_2^2 \tag{5}$$

In the radiation zone:

$$G = \frac{A^{(0)}}{\sqrt{2}}\left(X - iY\right)e^{i(\omega t - \kappa Z)} \tag{6}$$

$$\phi_L = \dot{G} \tag{7}$$

$$\Box G_1 = \Box G_2 = 0$$

$$H = \frac{2}{\mu_0}\int \boldsymbol{B}^{(3)} \cdot \boldsymbol{B}^{(3)*} dV \tag{8}$$

This energy represents a stream of photons without fields in free space. As soon as these photons interact with electrons, fields reappear through the principles of quantum electrodynamics. These photons cannot be detected by antennae set up to detect fields until the photons hit the antenna. The heat associated with the energy (δ) can be made to be very intense if the transmitter is very powerful. The double dipole antenna is oriented in the same way as a single dipole antenna, thus collimating the beam of photons.

The analysis is based on the very simple fact that if two vectors have the property $\boldsymbol{A} = -\boldsymbol{B}$ then $\boldsymbol{A}$ and $\boldsymbol{B}$ are **equal in magnitude** but opposite in direction.