ON EXTENDING WHITTAKER'S THEORY, PART VI: PHOTONS WITHOUT FIELDS AND VECTOR POTENTIALS

We start with:

$$A = \frac{1}{c}\dot{f} - \nabla \times g; \qquad B = \nabla \times A \tag{1}$$

$$S = -c\nabla \times f - \dot{g}; \qquad E = -\nabla \times S. \tag{2}$$

If $\dot{f} = \mathbf{0}$ and $\nabla \times g = \mathbf{0}$ in eqn. (1a), then A and B vanish.

This means:

$$f = F(X, Y, Z)\,k \tag{3}$$

$$g = G(t, Z)\,k \tag{4}$$

with:

$$\Box F = \Box G = 0. \tag{5}$$

In the vicinity of the source, let:

$$F = A^{(0)}(X - iY) \tag{6}$$

$$G = \frac{G^{(0)}}{\sqrt{2}} e^{i(\omega t - \kappa Z)} \tag{7}$$

The propagating potential is:

$$g = Gk$$

The propagating scalar potential is:

$$\phi_L = \dot{G} = ic\frac{A^{(0)}}{\sqrt{2}} e^{i(\omega t - \kappa Z)} \tag{8}$$

It can be checked that:

$$E = -\nabla \times S = \mathbf{0} \tag{9}$$

as follows:

$$\nabla \times f = A^{(0)} \begin{bmatrix} i & j & k \\ \frac{\partial}{\partial X} & \frac{\partial}{\partial Y} & \frac{\partial}{\partial Z} \\ X & -iY & 0 \end{bmatrix} = \mathbf{0}$$

An example of how fieldless *G*-waves can be generated is shown in Figure 1.

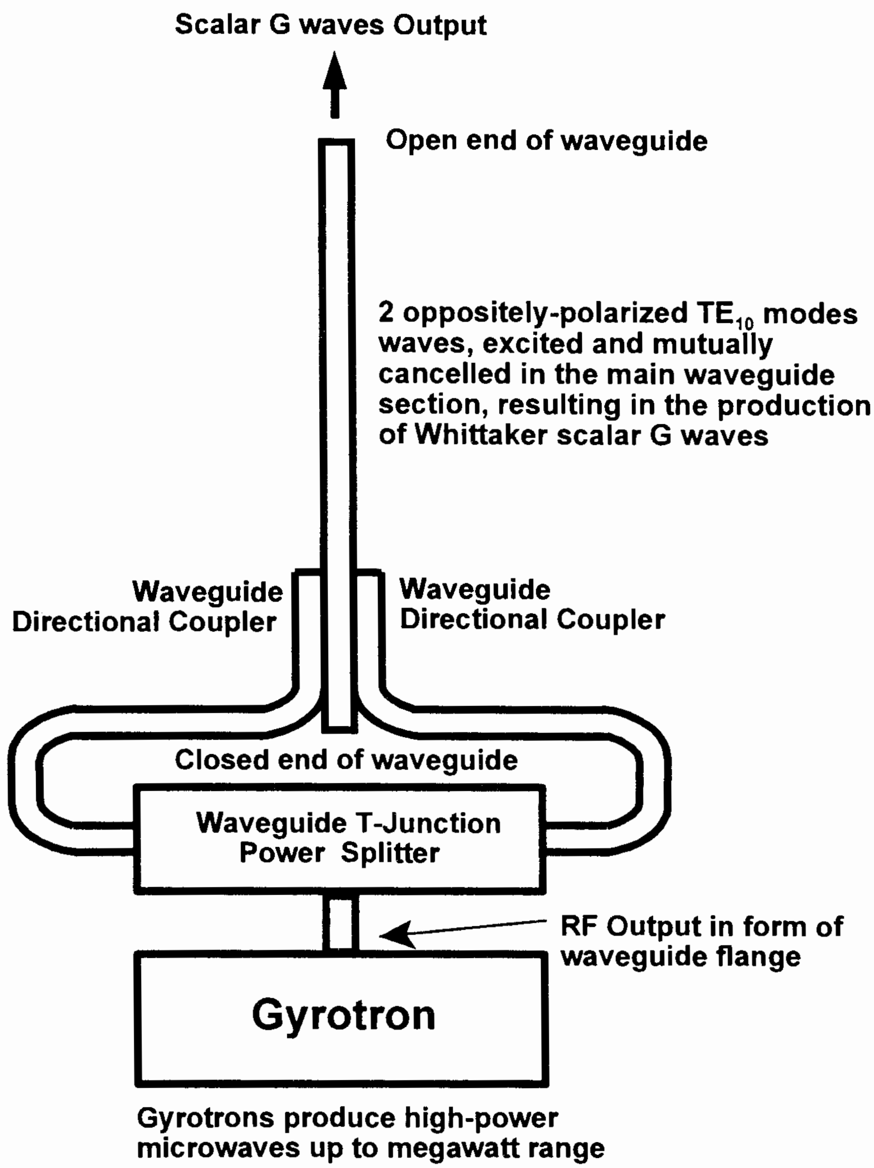

Figure 1: Practical conception for a source of scalar *G* waves.