1005-78-158          **Gregory A Kriegsmann\*** (`grkrie@micro.njit.edu`), Department of Mathematical Sciences, University Heights, Newark, NJ 07102. *Electromagnetic Propagation in Periodic Dielectric Media.* Preliminary report.

We have employed a homogenization procedure to describe the propagation of electromagnetic waves in a dielectric structure which is periodic in the X-Y plane and translationally invariant in the direction of propagation, Z. The fundamental cell is composed of an arbitrarily shaped pore filled with a dielectric and the host by another. The pore shape is allowed to depend upon Z.

Our analysis yields the structure of the electromagnetic fields at the micro level and gives an effective medium equation at the macro level. The latter contains a simple arithmetic average of the dielectric constants and a correction term which involves a line integral around the pore. The integrand of this integral depends upon the polarization of the wave and the solution to a canonical potential problem which has an equivalent variational formulation. We have used this to obtain a simple macroscopic description of the dielectric structure. (Received February 07, 2005)