1051-65-239 **Shekhar Guha***, Materials and Manufacturing Directorate, AFRL, WPAFB, OH 45433, **Leonel Gonzalez**, Materials and Manufacturing Directorate, AFRL, WPAFB, OH 45433, and **Qin Sheng** (qin_sheng@baylor.edu), Department of Mathematics, Baylor University, One Bear Place, Waco, TX 76798-7328. *Comparison of Transform Method and Local One-Dimensional Method in Description of Tightly Focused Light Propagation Through Nonlinear Optical Materials.* Preliminary report.

Light propagation is described by Maxwell's wave equation which can be solved using many different techniques. Readily available fast Fourier Transform (FFT) software makes the transform method an attractive way to solve the equation. An alternative technique is the local one dimension (LOD) method in which the wave equation is cast in the finite difference form and propagation in the two transverse dimensions are solved one at a time. This method is attractive because of the simplicity in programming and it doesn't need a pre-packaged transform program. For light propagation in cases of tight focusing, especially when nonlinear optical effects in materials are included, both methods run into computational challenges. In this work we will describe some of the challenges and compare the two schemes in their ability to tackle them. (Received August 25, 2009)