1023-35-1531   **James W. Rogers*** (`James_W_Rogers@baylor.edu`), Box 97328, Waco, TX 76798, and **Qin Sheng**. *Grid transformation numerical methods for laser beam propagation in nonhomogeneous media.* Preliminary report.

The paraxial approximation to the Helmholtz equation in polar coordinates has been proposed, in cases where transverse distances are small compared to the distance of propagation, as a simplified model of laser wave propagation in linear homogeneous media. For nonhomogeneous media, the solution of the PDE will not be smooth across an interface. Numerical solution methods must be carefully constructed to avoid oscillations and instabilities. This talk presents a new finite difference method for the nonhomogeneous case that involves transformation of the domain and an efficient finite difference scheme on a regular grid. The approach may lead to interesting adaptive and hybrid numerical computations for superior accuracy. Preliminary numerical results are compared with those obtained using other interface techniques. (Received September 26, 2006)