1014-34-429 **Qin Sheng*** (Qin_Sheng@Baylor.edu), Department of Mathematics, Baylor University, Waco, TX 76798-7328, and **Joseph W Haus** (jwhaus@udayton.edu), Electro-Optics Program, University of Dayton, Dayton, OH 45469-0245. *Nonstandard semi-implicit shooting methods for second order singular ODE boundary value problems.* Preliminary report.

Self-similar optical wave collapse has been a focus in nonlinear optical wave studies due to its increasingly important applications. The spatial profile of such a collapsing optical wave evolves to a specific shape, known as the Townes profile, for elliptically shaped or randomly distorted input beams.

The interesting phenomenon can be modeled through a Generalized Schrödinger Equation (GSE) boundary value problem which is difficult to solve since the differential equation problem involved is extremely sensitive to the initial values and spatial discretization parameters used.

However, in a circularly symmetric case, the GSE boundary value problem can be converted into a singular second order ordinary differential equation boundary value problem. In this talk, we will proposes two effective shooting strategies, based on uniform and nonuniform grids, for solving the anticipated ordinary differential equation effectively. Forced adaptation will be used. Numerical examples will be given to further illustrate our algorithms. (Received September 15, 2005)