**Meeting:** 1003, Atlanta, Georgia, SS 26A, AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, I

1003-65-348 **Qin Sheng*** (qsheng@udayton.edu), Department of Mathematics, University of Dayton, Dayton, OH 45469-2312, and **Joseph W Haus** (jwhaus@udayton.edu), E-Optics Program, University of Dayton, Dayton, OH 45469-0245. *A numerical study of the nonlinear optical wave collapse on time scales.* Preliminary report.

Abstract: Nonlinear wave collapse has been an important physical phenomenon discussed in many areas of applied sciences, including optics, hydrodynamics and numerical analysis. In optical computations, propagation of a laser beam through a transparent medium is described by the two-dimensional Schrödinger equation, and wave collapse occurs when nonlinear focusing due to the intensity-dependent refractive index overcomes linear diffraction. The collapse ultimately provides an upper limit on the power in the beam that can be transmitted through the medium without significant damage to the material. Needless to say, precise predictions of such physical phenomenon are extremely meaningful in most laser product designs and applications. In this talk, we will show initial explorations of the time scales theory and methods for the important computational issue. Cylindric spatial domains are considered. The time scales methods not only provide a simple and accurate way for the computations, but also offer an interesting insight into the Townes profile which governs the nonlinear wave collapse. (Received September 13, 2004)