1046-78-318 **Dawn Alisha Lott*** (dlott@desu.edu), Applied Mathematics and Theoretical Physics, Delaware State University, 1200 N. DuPont Highway, Dover, DE 19901, and **Anjan Biswas** (abiswas@desu.edu), Applied Mathematics and Theoretical Physics, Delaware State University, 1200 N. DuPont Highway, Dover, DE 19901. *A numerical study of optical soliton-like structures resulting from the nonlinear Schrödinger equation with square-root law nonlinearity.*

An analytical and numerical investigation of the propagation of optical beams in Kerr term-like saturable photorefractive media is performed. The major problem studied is the instability of beam propagation in nonlinear self-focusing optical media by the Runge-Kutta finite-difference numerical technique. The resulting soliton-like structures propagate and develop modulational instabilities which lead to the breakup of simple beam arrangements into more complex ones. The direct numerical simulation of the nonlinear Schrödinger's equation with square root law nonlinearity is performed. Gaussian, super-Gaussian, and sech pulses pulses are obtained numerically. Finally the ordinary differential equation that is obtained by the travelling wave ansatz is also studied numerically, with appropiate initial condition, leading to a traveling wave-like solution. (Received August 26, 2008)