1100-65-40 **Weizhong Dai*** (dai@coes.latech.edu), Mathematics and Statistics, College of Engineering and Science, Louisiana Tech University, Ruston, LA 71272. *A G-FDTD Scheme for Solving Multi-Dimensional Open Dissipative Gross-Pitaevskii Equations.*

Behaviors of dark soliton propagation, collision, and vortex formation in the context of a non-equilibrium condensate are interesting to study. This can be explored by solving open dissipative Gross-Pitaevskii equations (dGPE's) in multiple dimensions, which are a generalization of the standard Gross-Pitasvskii equation that includes effects of the condensate gain and loss. In this article, we present a generalized finite-difference time-domain (G-FDTD) scheme, which is explicit and stable and permits an accurate solution with simple computation, for solving the multi-dimensional dGPE. Moreover, it is shown that the stability condition for the scheme offers a more relaxed time step restriction than the popular pseudo-spectral method. The G-FDTD scheme is then employed to simulate the dark solution propagation, collision, and vortex formation. (Received January 20, 2014)