1064-65-350 **Misun Min*** (mmin@mcs.anl.gov), 9700 S. Cass Ave, Argonne, IL 60439, and **Paul Fischer**. *An efficient high-order time-integration method based on Krylov appraoximations for electromagnetic modeling.*

We present efficient algorithms and practical implementation of an explicit-type high-order timestepping method based on Krylov subspace approximations, with a motivation for possible application to large-scale engineering problems in electromagnetics, specifically accelerator modleing and nanophotnics applications. We consider a semi-discrete form of the Maxwell's equations resulting from spectral-element discontinuous Galerkin discretizations in space whose solution can be expressed analytically by a large size matrix exponential of dimension n x n. We project the matrix exponential into a small Krylov subspace by Arnoldi process and perform matrix exponential operation with a much smaller matrix of dimension m x m (m ¡¡ n), whose convergence is generally the order of (m-1) in time. This method allows to take larger timestep sizes as m increases so that total simulation time can be reduced. We demonstrate CPU time reduction in comparison to the results by the the 4th-order Runge-Kutta method. Parallel implementation and efficiency at large scale will be also discussed. (Received September 14, 2010)