EMMANUEL LORIN, University of Ontario Institute of Technology
Study of a micro-macro model for electromagnetic field propagation in a gas

In this work we are interested in the study of a micro-macro Maxwell–Schroedinger system, modeling the propagation of intense and high frequency electromagnetic fields in dense gaseous media (Comput. Phys. Comm. **177**, 2007; New J. Physics **10**, 2008). In the first part of the talk, we will focus on the existence and uniqueness of weak solutions, and some properties of the model related to ionization, plasma effects and high order nonlinearities. In the second part, we are interested in some particular but fundamental (for applications) solutions called filaments. In this goal, we will propose some numerical simulations, and a formal comparison of the Maxwell–Schroedinger system with some existing nonlinear wave and Schroedinger equations, that are well known to possess filaments as solutions.

This work is a collaboration with Prof. A. Bandrauk, and Dr. S. Chelkowski (University of Sherbrooke). Simulations are performed on the HPC Mammouth (RQCHP).