Atelier
« Modèles et méthodes mathématiques en filamentation laser »
10-14 mars 2014

Workshop
"Mathematical Methods and Models in Laser Filamentation"
March 10–14, 2014

Non-perturbative light-matter interactions in extreme nonlinear optics

Miroslav Kolesik [*]

kolesik@optics.arizona.edu

Modern nonlinear optics deals with regimes in which both bound and free electronic states contribute to the medium response. In fact, the dynamics is often naturally attracted to that specific range of optical field intensities in which the very distinction between bound and free electrons begins to loose its meaning. Accurate modeling of such dynamics is obviously very challenging. This presentation will concentrate on self-consistent, non-perturbative approaches to capture these interactions in computationally efficient ways. In particular, I will demonstrate how detailed understanding of simple test-bed systems can translate into methods applicable to realistic-system models. I will conclude my talk with several examples, concentrating on the longer-wavelength nonlinear optics, where simulations reveal some unexpected effects.

Joint work with A. Teleki, J.V. Moloney, E.M. Wright, J. Brown, J. Andreasen, D. Faccio.

[*] College of Optical Sciences, The University of Arizona, 1630 E. University Blvd., P.O. Box 210094, Tucson, AZ 85721-0094, USA.