光量子科学研究センターセミナー・フォトンサイエンス研究機構セミナー・先端光量子科学アライアンス談話会・
コヒーレントフォトン技術によるイノベーション拠点(ICCPT)セミナー・
フォトンサイエンス・リーディング大学院・東京大学統合物質科学リーダー養成プログラム・
最先端融合科学イノベーション教育研究コンソーシアム

Spatial-temporal coupling in ultrafast optical systems and femtosecond laser micromachinining

Professor Yuri Svirko

(Institute of Photonics, University of Eastern Finland)

日　時　：　平成 28 年 2 月 19 日(金) 11:00-12:00

場　所　：　東京大学理学部 1 号館 4 階 414 号室

Abstract

Modification of transparent materials with ultrafast lasers has attracted considerable interest due to a wide range of applications including laser surgery, integrated optics, optical data storage, 3D micro- and nano-structuring. For decades, spatio-temporal couplings in ultrafast optical systems have been relatively ignored and thought of as a hindrance because they typically arise from misaligned pulse compressors and dispersion optics. A combination of spatial chirp and angular dispersion can lead to a tilt of the pulse intensity front (PFT). Although the PFT is usually an unwanted phenomenon, it has been found to be greatly beneficial for nonlinear frequency conversion with ultrafast lasers and THz generation. Alongside PFT, there exists a relatively unknown spatio-temporal coupling known as the wavefront rotation (WFR), which manifests itself as a lighthouse-like rotation of the beam wavefront. Recently WFR has been utilized for generation of high harmonics and angular separation of the successive attosecond pulses generated in the laser plasma. In the presentation, we consider manifestation of the spatial-temporal coupling in the femtosecond micromachining with transparent dielectrics. In particular, we show that PFT and WFR result in the dependence of the light-induced modification of silica on the direction of the laser spot movement. The directional dependence of writing in lithium niobate depends also on the orientation of a crystal axis with respect to direction of the beam movement and the light propagation direction.

紹介教員：　湯本潤司教授(フォトンサイエンス研究機構)

本件連絡先：　office@psc.t.u-tokyo.ac.jp