

Time-resolved dynamics of solvated electron

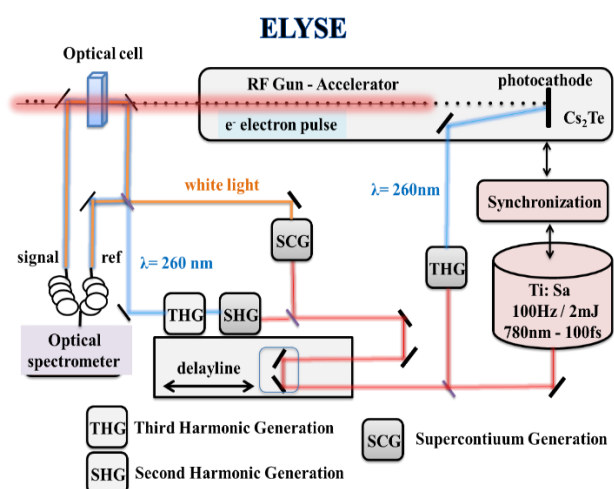
Location: LCP, Orsay

Researcher in charge of the Trainees: Dr. DENISOV Sergey

Maximum number of Trainees: 3

Experiment:

The ELYSE electron accelerator facility is used to conduct time-resolved radiolysis experiments, using picosecond electron pulses. The transient absorption electron pulse–optical probe setup is based on the laser–electron intrinsic synchronization resulting from the laser-triggered photocathode. The main part of the femtosecond laser output is used to produce the electron pulse that is accelerated to relativistic energies by RF fields and used as the pump. A part of the laser source is split off to generate the optical probe pulse that can be delayed relative to the electron bunch by a mechanical translation stage. A supercontinuum generated in CaF_2 is used as the optical probe and recorded with a multichannel detection system. The electron pump and the broad-band probe beam are directed collinearly through the sample.



Schedule expected:

The Trainees will participate in the measurement of a solvated electron decay in water obtained by picosecond electron radiolysis in a long time range (<8ns). The rate of electron relaxation in water will be calculated and solvated electron spectrum will be obtained, the dose of electrons will be calculated.

References:

1. Belloni, J., H. Monard, F. Gobert, J. P. Larbre, A. Demarque, V. De Waele, I. Lampre, J. L. Marignier, M. Mostafavi, et al. "ELYSE - A Picosecond Electron Accelerator for Pulse Radiolysis Research." *Nucl. Instruments Methods Phys. Res. Sect. A Accel. Spectrometers, Detect. Assoc. Equip.* **539**. 2005. P. 527–539
2. Marignier, J.-L., V de Waele, H Monard, F Gobert, J.-P. Larbre, A Demarque, M Mostafavi, and J Belloni. "Time-Resolved Spectroscopy at the Picosecond Laser-Triggered Electron Accelerator ELYSE." *Radiat. Phys. Chem.* **75**. 2006. P. 1024–1033.
3. Bartels, D. M., Cook, A. R, Mudaliar, M. and Jonah, C. D.. "Spur Decay of the Solvated Electron in Picosecond Radiolysis Measured with Time-Correlated Absorption Spectroscopy." *J. Phys. Chem. A*. **104**. 2000. P. 1686–1691.