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| University of Szeged, Department of Optics & Quantum ElectronicsTeWaTi Laser Laboratory |  |

**Profile:**

The laser-related research activities at the Departments of Physics of University of Szeged, the leading higher education site on the field of photonics in Hungary, have been at the international forefront since the seventies. The TeWaTi laser system at the Department of Optics and Quantum Electronics has been the very first - and only one - TW-class Ti:sapphire-based femtosecond chirped pulse amplification laser system in Hungary since 2001. The main parameters are more than 50 mJ pulse energy, 25 fs duration at 10 Hz repetition rate, while the frontend provides 1.5mJ energy, 20 fs at 200 Hz repetition rate in the NIR.

The fields of research are ranging from nonlinear optics, through high harmonic generation, attosecond physics, surface and material sciences to diagnostic development and industrial applications. The TeWaTi research group consists of 15 scientists from different scientific fields.

Thanks to the scientific and geographical vicinity, TeWaTi group participates in the ELI project since its beginning. We have a broad cooperation network not only in Hungary but all across Europe, most notably in France and Germany. Our research group is involved in the LaserLab Europe program since 2009.

Education is also a defining activity of our group. A separate practice room called hELIos laboratory provides opportunity to students and young scientists to learn the basics of the ultrafast laser technology.

**Fields of cooperation:**

* **Generating, amplifying and measuring femtosecond pulses: Ti:sapphire-based chirped pulse amplification schemes**
* **Attosecond physics: generation of high harmonics, creating attosecond pulses**
* **Development of fs pulse diagnostic systems: spectrally resolved interferometry methods, analyzing and stability of carrier-envelope phase**
* **Time-resolved spectroscopy of biological and chemical samples with pump-probe experiments**
* **Measuring dispersion properties of solutions, gases, coated mirrors, prisms, photonic fibers and other optical elements**
* **Surface structuring with ultrashort laser pulses**
* **Analyzing of laser-induced damage threshold of optical elements with different laser parameters**
* **hELIos student lab: education and preparation for modern laser research e.g. in ELI-ALPS**

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