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Ultrashort pulses and ultrafast processes in physics

Ferenc Krausz, Anne L’Huillier and Pierre Agostini won the Nobel Prize in Physics 2023 for methods that generate ultrashort attosecond pulses of light that provided the opportunity to study superfast electron processes in atoms and molecules. The „Optics and Spectroscopy“ journal continues to cover the topic of superfast physical processes, optics and condensed matter physics. The issue as of February 2024 publishes the proceedings of the „UltrafastLight-2023“ conference held on October 2–4, 2023 at Lebedev Institute of Physics RAS in Moscow. There were more than 170 participants, with more than a half of them being young researchers, postgraduates and students who had a unique opportunity to present their findings and discuss research problems with their colleagues from leading Russian and foreign universities and research organizations. Articles prepared by the teams of authors cover the following topics:

- radiation and photonics in superstrong fields;
- superfast physical phenomena in ionized gases, semiconductors and metals;
- superfast laser techniques and structured light in microoptics and nanophotonics;
- diamond photonics;
- ultra-short pulse spectroscopy and optical frequency metrology;
- superfast optical technology and nonlinear optical phenomena;
- superfast optical technology in biomedicine.

School of young researchers „Quantum Laser Technologies for Broadband Spectral Identification of Optically Active Point Defect Complexes in Natural Diamonds for Industrial Tracing“ supported by the Russian Science Foundation (Grant №. 21-79-30063) covered a great amount of studies devoted to the investigation of impurity structure, plastic deformations, color centers in natural and synthetic diamonds, and addressed their potential applications.

Editors of this issue invite the readers to have a look at up-to-date research and applied studies in various areas of physics superfast processes that provide interesting materials for general readers of the „Optics and Spectroscopy“ journal.

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