OptoSpintronics

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Spintronics is a new dynamic branch of electronics that uses magnetic moment – spin – of charged carriers for data storage and processing. Recently, utilization of light in spintronics has established its new “optospintronic” branch. The application of ultrafast laser spectroscopy, which has a long term tradition at MFF UK, for the research of ferromagnetic materials enabled us to discover several new phenomena. They can be used to modify and to study magnetic order in materials on ultrashort time scales (down to femtoseconds), which is by several orders of magnitude faster than other existing experimental techniques. In particular, the discovered phenomena combine the photo-effect, a phenomenon which is at the very heart of semiconductor optoelectronics, with the non-relativistic spin-transfer-torque and the relativistic spin-orbit coupling effects. These new phenomena are expected to find applications in the development of magnetic random access memories. For this work, members of the joint Laboratory of OptoSpintronics of MFF UK and FZU AV ČR, which is headed by P. Němec, were awarded the Bedřich Hrozný Prize of the Charles University in 2014.

Selected outputs