

# **Magneto-optical spectroscopy as a probe to electronic structure and magnetism of materials and nanostructures**

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## Abstract:

Magneto-optical effects play an important role in both research and application fields. Magneto-optical experiments are widely used as non-destructive, depth sensitive and extremely precise tools to explore basic and novel physical phenomena and properties of magnetic materials. Magnetic field dependent magneto-optical measurements under different field orientations can provide a useful insight into the magnetic anisotropy of studied materials even for very small magnetizations. On the other hand, one can use spectrally dependent measurements in combination with ab-initio calculations to analyze electronic transitions across the band structure to map particular electronic states with large splitting. Moreover, a combination of the field and spectrally dependent magneto-optical measurements, which gives energy dependent hysteresis loops, can provide useful insight into the magnetism of various sublattices in multi-sublattice magnetic systems, interface phenomena or surface magnetism. The talk will provide an overview of the recent magneto-optical research in the field of ferrimagnetic garnets for integrated photonics, magneto-ionic control of magnetic anisotropy or non-collinear antiferromagnetic materials. It will also sketch new possibilities and opportunities to produce the next generation of spin-controlled photonic devices.