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Applying ptychography to phase-sensitive laser beam characterization

To predict the propagation of a laser beam through an optical assembly, it is crucial to determine its spatial electric field. Standard beam profilers only measure amplitude, but a wavefront cannot be retrieved. Also, the standardized M2 method does not deliver the full phase information of a laser beam. The goal of the student project is to test a simple but very powerful method to overcome this shortcoming of the most common characterization methods. The technique under investigation relies on ptychographic phase reconstruction which has become popular in the field of x-ray and ultraviolet imaging. Its transfer to laser characterization presents an extremely valuable extension to state-of-the-art with significant impact on beamline and multi-pass cell construction, for instance. The student will mainly work in cutting-edge ultrafast laser laboratories to test the novel method and to compare them with established techniques. Moreover, the student will apply and if needed modify the existing ptychography code in order to evaluate data.

Group

FS-LA

Project Category

A5. Lasers and optics

Special Qualifications

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