SFB/TRR 21 - Seminar

24. August 2012, Stuttgart

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Improvement of SLM fidelity in hologram generation for laser shaping and cold atom applications

In the context of cold atoms physics, we aim to manipulate and trap cold atoms with spatially shaped optical potentials. Shaped laser beams offer a large variety of shapes and geometries for such potentials. In our group we have developed a method using a phase-only spatial light modulator (SLM) in a holographic setup. Such a device allows us to generate a phase hologram, previously designed by a software and change it in time. Because the manipulation of cold atoms requires high quality optical potentials, it is very important to accurately control the generated hologram. Even if SLM performances have been improved, standard SLM still suffer from some defects, like a lack of fidelity to reproduce the desired hologram for example. We have experienced a method to monitor the SLM phase pattern during a running experiment and in a second instance implemented a method to actively correct SLM defects. This method is based on birefringence mapping. The dynamic correction has been tested to correct a SLM defect induced by an intense laser beam which perturbs locally the SLM properties. I will describe the method, the setup and conclude with examples of applications, especially in cold atoms context.

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