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Spatial light modulators for cold atom manipulation LAURENCE PRUVOST, MICHAEL MESTRE, FABIENNE DIRY, BRUNO VIARIS DE LESEGNO, lab Aimé Cotton, cnrs Orsay, LAC TEAM — Spatial Light Modulators (SLM's) are programmable optical elements that can act as dynamical holograms, providing flexible control over the light intensity of a laser in a given plane. Thus, the operator can manipulate small objects using the forces that arise from the dipole force. They are being used for a wide range of applications, including biology, condensed matter physics, quantum optics and atomic physics. Our group is performing experiments using SLM's for cold atom manipulation. First we have focused on response time and diffraction pattern quality issues. We have demonstrated a device involving a SLM and an acousto-optic modulator (AOM/SLM) with a refresh time of some micro-seconds and without bleed effect during the hologram changes [1]. This device would be well-suited for cold atom manipulation with time-dependent dipole potentials. We have experimented with cold rubidium atom guiding using hollow Laguerre-Gaussian beams obtained by applying helical-phase holograms to laser beam. Future applications of this technique will be presented and discussed in the context of cold atoms or Bose-Einstein condensates experiments. [1] Fast reconfigurable and transient-less holographic beam-shaping realized by a AOM-SLM device, M. Mestre, B. Viaris de Lesegno, R. Farcy, L. Pruvost, J. Bourderionnet, A. Delboulbe, B. Loiseaux, and, D. Dolfi, Eur. Phys. J. Appl. Phys. **40**, 269–274 (2007).

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