

Abstract Submitted  
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**Spatial light modulators for cold atom manipulation: guiding into a Laguerre-Gaussian mode** LAURENCE PRUVOST, MICHAEL MESTRE, FABIENNE DIRY, BRUNO VIARIS DE LESEGNO, Laboratoire Aimé Cotton, Univ Paris Sud, CNRS — Spatial Light Modulators (SLM's) are programmable optical elements that can act as dynamical holograms. They provide a flexible method to create by holography any distribution of laser intensity. It only requires a good determination of the phase-hologram to apply to the laser beam. Such a method allows one to generate a large variety of optical potentials and to foresee applications for cold atom manipulation. In this context, with helical phase-holograms we have first generated almost-pure Laguerre-Gaussian laser modes of  $k$  order (LG0 $k$ ). Then we have applied the obtained beam to a cold -10 micro-Kelvin- sample of rubidium atoms. Using a blue-detuned laser light we have confined the atoms inside the dark region of the LG mode. We present a quantitative study of the guidance efficiency versus the laser detuning, the order of the Laguerre-Gaussian beam and the beam dimension. We propose a two-dimensional capture model to interpret the results. We discuss also future possible development of this work.

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