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In matter wave lensing magnetic and optical harmonic potentials are used to collimate and focus matter waves. One of its key applications which I am interested in is atom lithography. By phase imprinting a design on these harmonic potentials, it can be transferred to the trapped atoms. With matter wave lensing we get a real time control of the size of these patterns which can be transferred to a suitable substrate.

We use rubidium 87 as the atomic source for creating matter waves or Bose Einstein Condensate. Rubidium atoms are evaporative cooled to form BECs in a crossed optical dipole trap. By choosing an appropriate frequency of the quadratic potential, we can focus the cloud and reduce its size after phase masking using an optical potential, which in turn can be transferred to a rubidium sensitive substrate.

Poster Abstract

Session Classification: Poster Session

Track Classification: Experimental - Tabletop experiments