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# A rotating BEC in a connected trap and in a ring trap

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## Abstract

We prepare a Bose-Einstein Condensate (BEC) in a rotating state, both in a harmonic trap and in a ring trap .

Firstly, we form a "bubble trap" by dressing rubidium atoms in a quadrupole trap with a radiofrequency field. Because of gravity, the atoms are trapped at the bottom of the "bubble trap". We then deform the trap by changing the polarization of the dressing radio-frequency, which makes the harmonic trap elliptic. After rotating this trap deformation, we manage to set the gas into

rotation in the trap. We observe a vortex lattice, which melts at higher rotation frequencies. As for the ring trap, we shine two parallel blue detuned light sheets to connect the atoms between them. We catch the atoms at the bottom of the bubble between the beams. After shifting the "bubble" vertically, the ring trap is formed at the intersection of the "bubble" and the horizontal conning plane. Moreover, we manage to rotate the BEC in this ring trap by using the same method of rotating BEC at the bottom of the "bubble trap". This results in a persistent flow of the quantum gas around the annulus.

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