Superfluid rotation sensor with helical laser trap ALEXEY
OKULOV, Russian Academy of Sciences — The macroscopic quantum states of
cold atomic ensemble[1] in helical laser trap[2] are considered in the framework of the
Gross-Pitaevskii equation. The helical interference pattern is composed of the two
counter propagating Laguerre-Gaussian optical vortices with opposite orbital an-
gular momenta and they are driven in rotation via angular Doppler effect.[3] The
macroscopic observables including linear momentum and angular momentum are
evaluated explicitly.[4]

[1] F. Dalfovo et al. Rev.Mod.Phys., **71**, 463 (1999).
[2] A.Yu.Okulov. J. Phys. B , **41**, 101001 (2008).
[3] A.Yu.Okulov. J. Opt. Soc. Am. B, **29**, in press (2012).
[4] A.Yu.Okulov. Phys.Lett.A, **376**, 650-655 (2012).

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