

Abstract Submitted
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Far-off-resonant ring trap near the ends of optical fibers¹ FRANK MOSCATELLI, Swarthmore College, CHARLES SACKETT, University of Virginia, SHENGWANG DU, Stanford University, EUN OH, U.S. Naval Research Laboratory — We propose that micrometer-sized atom traps can be created using the optical dipole force between the ends of two single-mode optical fibers carrying counter-propagating light beams of two different wavelengths from both fibers. The traps have a simple design that is feasible to implement with commercially available products. They can be used as a flexible “atom tweezers” to manipulate atoms in free space without the need for traditional focused laser beams. A particularly interesting feature is the formation of a static ring-shaped trap for properly chosen beam parameters. Furthermore, the ring can be split into two longitudinally adjacent rings. Microscopic ring traps such as this could have important applications in atom interferometry and fundamental investigations of Bose-Einstein condensates.

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