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Single beam optical vortex tweezers with tunable orbital angular momentum

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We propose a single beam method for generating optical vortices with tunable optical angular momentum without altering the intensity distribution. With the initial polarization state varying from linear to circular, we gradually control the torque transferred to the trapped non-absorbing and non-birefringent silica beads. The continuous transition from the maximum rotation speed to zero without changing the trapping potential gives a way to study the complex tribological interactions. © *2014 AIP Publishing LLC*. [http://dx.doi.org/10.1063/1.4882418]

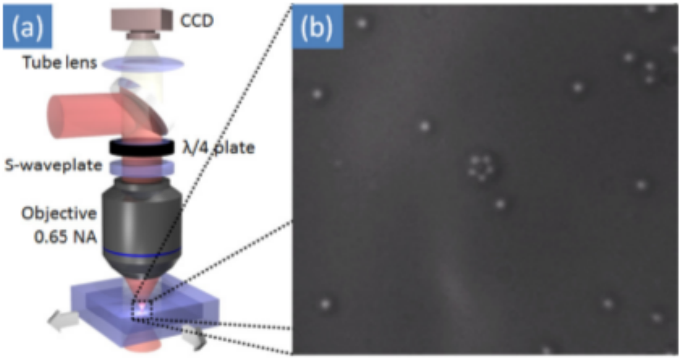

FIG. 2. (a) Experimental trapping setup. (b) The image of five fused silica beads assembled into a ring.

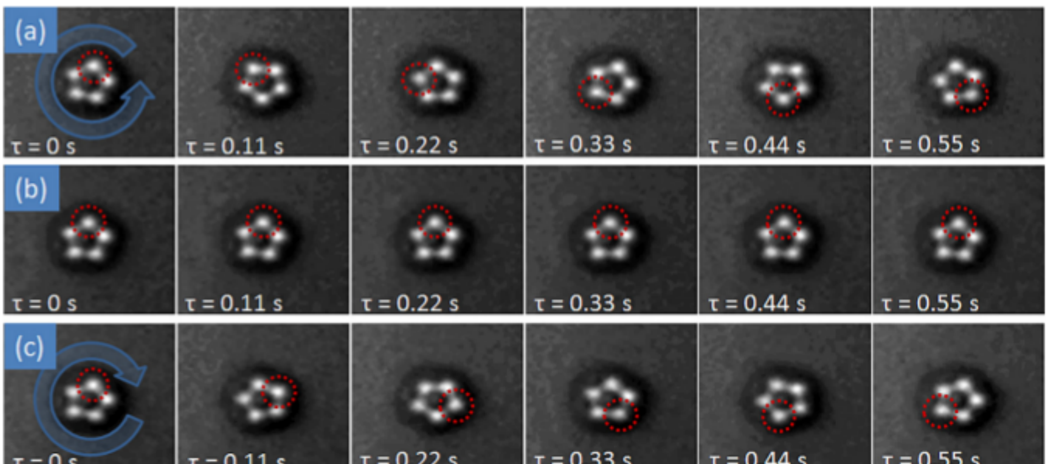

FIG. 3. The rotation of five trapped SiO_2 beads. (a) Particles rotate counter clockwise when polarization before the S-waveplate is right-handed circular. (b) Beads do not rotate when polarization before S-waveplate is linear. (c) Particles rotate clockwise when polarization before the S-waveplate is left-handed circular (Multimedia view) [URL: http://dx.doi.org/10.1063/1.4882418.1].