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Broadband light based optoelectric tweezers AVANISH MISHRA, KATHERINE CLAYTON, STEVE WERELEY, Purdue University — Trapping, sorting and transport of particles are fundamental operations in microfluidic platforms. However, very few methods exist that can dynamically trap and manipulate particles with high spatial resolution and accuracy. Recently, a new set of methods have emerged that can trap and sort particles by optically controlling electrokinetic effects. Rapid Electrokinetic Patterning (REP) is such an emerging optoelectric technique. It utilizes a laser activated electrothermal (ET) vortex and particle-electrode interactions for trapping particles. Trapped particles can be translated by optically steering the laser or by moving the trapping chamber. Previously demonstrated applications of REP have utilized a 1064 nm infrared laser, integrated in an inverted microscope, to create the necessary temperature rise for producing the ET flow. Use of an external laser for REP trapping is expensive and time intensive to integrate, making it difficult to design a portable REP system. Using experiments and simulations, we show that a non-coherent incandescent broadband light source can be used for REP trapping and manipulation. This allows for a microscope with a broadband lamp to be used for REP trapping without integrating an external laser.

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