

Title: Ultrasonic tweezers for particle manipulation

Abstract: Ultrasonic tweezers allow dexterous manipulation of particles, such as biological cells. A series of ultrasonic sources are used to create a potential energy landscape (force field) that can then be controlled to perform a wide range of manipulation functions. Typically the devices are operated in the megahertz frequency range where the ultrasonic wavelength is of the order of 100 micrometers - and this dimension sets the spatial resolution of the tweezer. Devices have been developed for a range of biological applications. Ultimately the uses are in applications such as tissue engineering, where ultrasonic tweezers can potentially bring together populations of cells to form multi-layered tissue structures of centimetre scale. There is also significant interest in bringing optical and ultrasonic tweezers to work across a very wide range of length scales.

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