

# Light-Actuated Marangoni Tweezers

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A novel method for the trapping and manipulation of small particle using light-induced hydrodynamic flow is demonstrated. The trapping mechanism relies on the light-induced switching between the isomeric states of an azobenzene-based photoresponsive surfactant. The localized photoswitching and resulting gradient in surface tension towards the focal point generate a converging fluid flow (Marangoni flow). This hydrodynamic flow is utilized for the trapping and manipulation of objects adsorbed at the interface. The trapping is achieved at a lower light intensity than for optical tweezers. This principle of optically-controlled Marangoni tweezers opens new application perspectives, for example for the manipulation of nanoparticles. This is due to the fact that the hydrodynamic force exhibits a more favorable scaling with the particle size than the optical gradient forces utilized in conventional optical tweezers.

## References:

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- [2] S. N. Varanakkottu, S. D. George, T. Baier, S. Hardt, M. Ewald, and M. Biesalski, "Manipulation of microparticles and biological cells using light-induced Marangoni flow", *Proc: MicroTAS 2013*, 748-750 (2013).