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Organization and assembly of microstructures using optical tweezers and in-situ two-photon polymerization NINAD INGLE, SAMARENDRA MOHANTY — Precise manipulation and organization of objects at microscale using optical tweezers has led to new discoveries in colloidal physics and material science in last two decades. However, long-term stabilization and integration of the optically assembled structures in absence of laser tweezers beam requires precise polymerization of the matrix. Here, we report two-photon polymerization induced assembly of microscopic objects being organized by optical tweezers. A tunable cw Ti: Sapphire laser beam was coupled to the laser port above the epifluorescence port of an inverted microscope in order to trap and organize fluorescence microspheres embedded inside photopolymerizable resin following which the laser beam was modelocked in order to initiate two-photon polymerization. Nanonics Multiview piezo stage enabled controlled scanning of the sample. Further, the laser beam was spatially-structured into an elliptic profile by use of a cylindrical lens in order to trap multiple objects simultaneously and stitch them together with the two-photon polymerization process. Use of such micro-assembled structures in Nanophotonics and cellular manipulation will be presented.

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