Laser Manipulation for Micro Particles and Droplets

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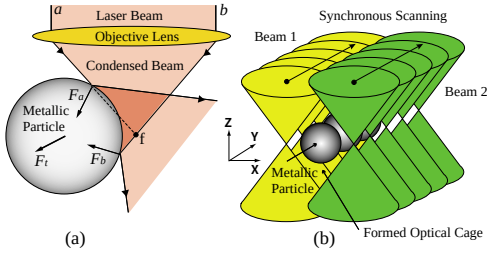
One of the non-contact micro manipulating techniques is optical tweezers, but this technique can not apply to metallic particles. We have developed a new non-contact micro manipulating method for particles with low refractive index or high reflectance such as metals. The method forms optical cages by synchronous scanning laser beams, and arrange the particles in the cages. This idea enlarges the ability of the conventional optical tweezers. We are aiming the sophisticated non-contact 3D micro manipulating technique for micro total analysis systems (μ-TAS).



Basic principle of arrangement method for metallic particles

Mechanical Engineering and Manufacturing Technology

Self-Reconfigurable Modular Robot

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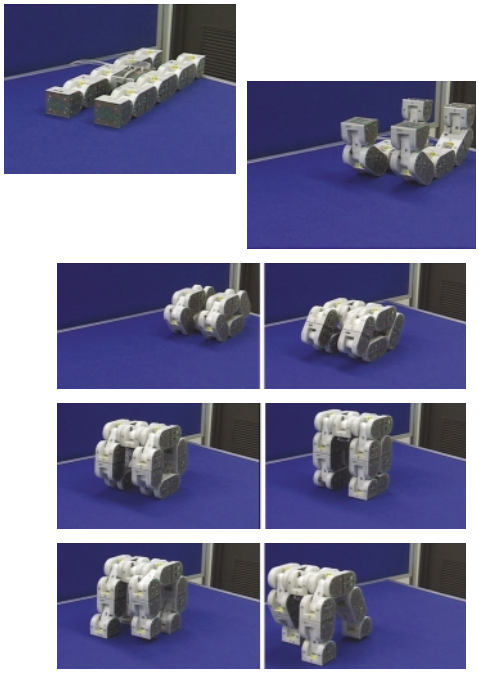
A modular robot has been developed jointly with Tokyo Institute of Technology. It is composed of nine modules and is the first in the world to be able to reconfigure its shape without outside help. It is planned to install distributed intelligence in each module , which enables the modular robot to execute self-reconfiguration and self-repair. Possible applications are operation and exploration in unknown environments where adaptation is required to the surroundings, as well as continuous operation under extreme environments where autonomous repair is necessary.



A nine module robot reconfigures from a crowler robot to a four legged walking robot