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Microoptomechanical Pumps Assembled and Driven by Holographic Optical Vortex Arrays KOSTA LADAVAC, Dept. of Physics, James Franck Institute and Institute for Biophysical Dynamics, University of Chicago, Chicago, IL 60637, DAVID GRIER, Dept. of Physics and Center for Soft Matter Research, New York University, New York, NY 10003 — Beams of light with helical wavefronts can be focused into ring-like optical traps known as optical vortices. The orbital angular momentum carried by photons in helical modes can be transferred to trapped mesoscopic objects and thereby coupled to a surrounding fluid. We demonstrate that arrays of optical vortices created with the holographic optical tweezer technique can assemble colloidal spheres into dynamically reconfigurable microoptomechanical pumps assembled by optical gradient forces and actuated by photon orbital angular momentum.

Kosta Ladavac
Dept. of Physics, James Franck Institute and Institute for Biophysical Dynamics,
University of Chicago, Chicago, IL 60637

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