

Abstract Submitted
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Enhancing optical gradient forces with metamaterials¹

VINCENT GINIS, Vrije Univ. Brussel, PHILIPPE TASSIN, Vrije Univ. Brussel and Ames Lab/Iowa State Univ., IRINA VERETENNICOFF, Vrije Univ. Brussel — The transfer of linear momentum from electromagnetic waves to matter and the associated optical forces allow to dynamically manipulate the geometry of nanophotonic components with electromagnetic fields. In recent years, it has been proposed to use optical gradient forces for all-optical actuation of nanophotonic systems. This would open up the possibility for information processing inside nanoscale devices. Despite many efforts to increase these forces in integrated systems, they remain too small for most practical applications. In this contribution, we demonstrate how optical gradient forces can be enhanced significantly with the use of metamaterials. By implementing the techniques of transformation optics, we show how a metamaterial slab allows for the magnification of optical forces over several magnitudes, even when realistic losses are included.

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