Helical light meets chiral nano-structures

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Abstract

Optical vortices, exhibiting an annular intensity profile and orbital angular momentum owing to a helical wavefront, have a potential to be applied to various fields such as optical manipulation, super resolution microscopy, and optical telecommunication.
Circularly polarized lights with a helical electric field also carry a spin angular momentum.
Recently, we and our co-workers have discovered that orbital and spin angular momenta of helical lights can force materials to form chiral structures on nano-scale. Such chiral structures will have the potential to open up a new materials science, such as nanoscale imaging systems with chiral selectivity of nano-composites, metamaterials, chiral plasmonics, and biomedical nano-electromechanical systems.
In this presentation, I review a state of art laser technology concerning helical lights. In particular, I also address physical properties of chiral structures formed by irradiation of helical lights.

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