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**Plasmonic Circular Dichroism of Chiral Nanoparticle Assemblies**[1]

ZHIYUAN FAN, HUI ZHANG, ALEXANDER GOVOROV, Physics and Astronomy Department, Ohio University, Athens, OHIO UNIVERSITY TEAM — Plasmonic circular dichroism(CD) of chiral metal nanoparticle(MNP) assemblies in the visible band results from dipolar and multipolar interaction between plasmons on MNPs. Both isotropic and anisotropic CD signals are extremely dimension-sensitive and strongly configuration-dependent. In this presentation, such geometry-dependence of plasmonic CD response will be analytically studied using an expansion of many-dipole interaction of the systems [1]. In the multipole regime, numerical simulations show new features of multipole plasmon interactions. One interesting observation is that a chiral equilateral tetramer made of 4 different NPs shows nearly zero CD response in the point dipole interaction regime but moderately strong CD response from multipole interaction of closely packed NP assemblies. Generally, CD signals of closely packed MNP assemblies are significantly enhanced and more sensitive to the geometric parameters. They can be used in many novel sensing applications as either solid-state or colloidal systems.

[1] Z. Fan, H. Zhang and A. O. Govorov, Optical Properties of Chiral Plasmonic Tetramers: Circular Dichroism and Multipole Effects, The Journal of Physical Chemistry C, 117 (28), 14770, 2013.

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