Abstract Submitted
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Optical activity and circular dichroism of plasmonic nanorod assemblies[1] LAROUSSE KHOSRAVI KHORASHAD, Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, USA, NA LIU, Max Planck Institute for Intelligent Systems, Heisenbergstrasse 3, D-70569 Stuttgart, Germany, ALEXANDER O. GOVOROV, Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, USA — Plasmonic circular dichroism (CD) has offered an efficient spectroscopy method for the electronic, chemical, and structural properties of different types of light active molecules in the subwavelength regime. Among the different chiral geometries of metal nanoparticles utilized by the plasmonic CD spectroscopy, gold nanorods (AuNRs) have shown strong CD signals in the visible frequency range. In this work, we theoretically study the CD signals of AuNR arrangements in order to mimic structures and chemical bonds of chiral biomolecules. In particular, our twisted three-AuNR geometries resemble a molecular structure of tartaric acid. This molecule played an important role in the discovery of chemical chirality. In our study, we show that the strength of CD signals changes dramatically by tuning the interparticle distances and angles. Since the CD signals are typically weak, we develop reliable computational approaches to calculate the plasmonic CD. Manipulating interparticle distances, size, and molecular bond angles result in full control over peak positions, handedness, and positive and negative bands which are observed in the CD spectra.

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