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Optical properties of chiral metal nanoparticle complexes: Plasmonic chirality and circular dichroism[1] ZHIYUAN FAN, ALEXANDER GOVOROV, Department of Physics and Astronomy, Ohio University, Athens, Ohio 45701, DEPARTMENT OF PHYSICS AND ASTRONOMY, OHIO UNIVERSITY TEAM — Plasmonic nanocrystals with chiral geometries are able to create strong circular dichroism (CD) signals in the visible wavelength range. This offers an interesting possibility to design colloidal and other nanostructures with strong optical chirality for applications in biosensors and optoelectronic devices. We present a theoretical study of circular dichroism from chiral metal nanoparticle (NP) complexes. Dipolar Coulomb interactions between NPs are involved as the main mechanism of interaction between spherical NPs in a chiral complex. In our analysis, the CD signal shows strong dependence on geometry and composition of chiral pyramids, tetramers, and helices. The CD spectra have both positive and negative bands. Strongest CD signals were found in helical chains of metal NPs, which resemble helical structures of many biomolecules.

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