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Chirality in Plasmonic Nanoparticles and Nanostructures

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The field of chirality has seen a strong rejuvenation due to the observation of nanoscale chirality in plasmonic nanoparticles. This lecture will highlight recent advances in the field of plasmonic chirality, including novel methods for the synthesis of optically active plasmonic nanomaterials. The focus will be first directed toward chiral nanostructures formed using biological templates, proteins in particular. After demonstration of the directed self-assembly of gold nanorods on amyloid fibers, as well as the mechanistic understanding of chirality at the nanoscale, a potential application for such nanomaterials will be presented. We propose that plasmon-enhanced chiral signals have great potential for use in the detection and therapy of neurodegenerative disorders.[1]

The second part of the lecture will deal with the seeded-growth of chiral features on colloidal nanoparticles. This effect can be achieved by using either thiolated amino acids[2] or chiral co-surfactants,[3,4] through distinct mechanisms, which can be manipulated to obtain nanoparticles with different chiral features and significant optical activity, which can be tuned through the visible and the near IR.

References

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