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DNA-bridged Chiroplasmonic Assemblies of Nanoparticles

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Chirality at nanoscale attracts a lot of attention during the last decade. A number of chiral nanoscale systems had been discovered ranging from individual nanoparticles to helical nanowires and from lithographically defined substrates. DNA bridges make possible *in-silico* engineering and practical construction of complex assemblies of nanoparticles with of both plasmonic and excitonic nature. In this presentation, expected and unexpected optical effects that we observed in chiral plasmonic and excitonic systems will be demonstrated. Special effort will be placed on the transitioning of theoretical and experimental knowledge about chiral nanoscale systems to applications. The most obvious direction for practical targets was so far, the design of metamaterials for negative refractive index optics. The results describing the 3D materials with the highest experimentally observed chiral anisotropy factor will be presented. It will be followed by the discussion of the recent developments in analytical application of chiral assemblies for detection of cancer and bacterial contamination.