Coupling of Elementary Excitations: Drawing Parallels Between Excitons and Plasmons

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Coupling of elementary excitations in the presence of light results in several newer optical phenomena. The coupling can be categorized as strong, weak and very weak, depending on the magnitude of the interaction. We have demonstrated examples of these interactions and its consequence on their optical properties. Our group has earlier demonstrated examples of exciton-exciton coupling in molecules, and plasmon-plasmon coupling in plasmonic systems by organizing them in symmetric as well as asymmetric fashion. As a consequence of such interactions, several fascinating chiroptical properties emerge. These aspects, along with our recent results on the generation of plexcitonic states will be presented in the first part of the talk. Precise assembly of plasmonic materials of desired size and shape allows further modulation of their optical and field effects, opening up several plasmonically powered processes such as surface enhanced spectroscopy. We have translated the principles of surface-enhanced spectroscopy for the design of plasmonic platforms, which can identify molecules of importance in health, environment and safety.

References