Investigation of semiconductor quantum nanostructures and plasmonic structures for photovoltaic applications.

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There is a great potential in field of photovoltaics. Last promising concepts take advantage of nanoscale materials to elaborate thin, cheap and efficient solar cells, which will enable their applications in modern, ecological everyday life. My research follows this general trend of so called Third Generation Solar Cells which introduction is predicted for year 2020. Field of my interest is semiconductors quantum dots (QD) and metal plasmonic nanoparticles. QD display quantum confinement effect, which result in differentiation of the band gap with particle diameter. This phenomenon give opportunity to provide tandem cells based on chip materials like silicon. Other approach uses the coupling of light with subwavelength metal particles to localized surface plasmons. Noble metal particles scatter incident light form area few times larger than real dimensions provide antireflection structure of nanometric size. In my experiments I try to elaborate optimal silver particles array as well as easy and chip methods of preparation.