Metallic hybrid particles (nanocomposites and nanoalloys) are one of the most exciting research objects in materials science because their optical, catalytic, and magnetic properties, different from their bulk values, may have numerous immediate technological applications. The inner structure is an essential parameter referring to these properties. Many possible structures can be encountered ranging from the formation of alloys to the coexistence of segregated phases (core−shell, onion-like, or Janus particles). Their occurrence depends on the physicochemical properties of both metals but also on the nanoparticle size, composition, environment, and method of synthesis.

To ensure unique quality, properties and functions, it is now essential to fabricate particles with specific structural characterizations. In this context, there is a profound interest in the development of reliable method, and to explore the possibilities of production of bi-metallic particles with controllable inner structure and physical properties. Laser-based synthesis is already proven to be an efficient and promising method for producing nanocomposite and alloy colloid particles. However, the mechanisms of composite formation is still not exactly understood, as well as the properties of the obtained nanoparticles.

Hence, our project aims at the study of how the internal structure of hybrid particles generated by laser irradiation are ruled by solvent and size of raw nanoparticles in colloidal solution.

Understanding the role of solvent and size of nanoparticles we could synthesized materials with desirable structures and properties.