

Pulsed laser ablation for nanoparticles production in liquids: fundamentals aspects and applications of Laser Induced Plasma in Liquids

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Nanoparticles and Nanostructures formation mechanisms during the Laser Ablation in Liquid (LAL):

How are these formation mechanisms related to the plasma and bubble dynamics, as well as to the environmental pressure?

- Optical Emission Spectroscopy for plasma characterization
- Fast shadowgraph for plasma and cavitation bubble dynamics study
- Laser scattering to probe the mechanisms of NPs release in solution
- Surface Plasmon Resonance (SPR) absorption spectroscopy for a first fast characterization of NPs colloidal solutions

Different experiments:

single and double pulse LAL

Different parameters changes:

target geometry (i.e. bulk and wire-shaped)

target nature (i. e. metals, non-metals)

external liquid pressure

Summary

Key role of cavitation bubble dynamics

Changing the parameters that affects the bubble dynamics features:

- Nanoparticles and nanostructures mechanisms formation study
- Control of the yield and the typology of nanostructures

Different application fields of naked NPs

Thank you for your attention