

### Plenarvortrag

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**Laser-generated functional nanomaterials** — ●STEPHAN BARCIKOWSKI — Laser Zentrum Hannover e.V.

Today, nanoparticles are widely implemented as functional elements in bioactive materials and nanocomposites. Nowadays, however, only a limited variety of materials that may be integrated into advanced functional materials are available: Nanoparticles synthesized by conventional gas phase processes are often agglomerated to micro powders that are hardly redispersible into functional matrices, and chemical methods often lead to impurities of the nanoparticle colloids caused by additives and precursor reaction products.

In the last decade, laser ablation in liquids has proven to be a unique

and efficient technique to generate, fragmentate, and conjugate elemental and nanoalloy nanoparticles. This exciting method bears strong advantages, mainly linked to the electron acceptor properties of the ligand-free colloidal nanoparticles. This charge is of multiple use: for embedding into polymer matrices as well as in-situ or delayed coupling to electron donating moieties like biomolecules.

Aspects of the fundamentals of laser ablation in liquids as well as novel applications, such as the laser-based fabrication of bioactive nanocomposite medical devices and multifunctional-bioconjugated nanoparticles that act as cell penetrating nanomarkers will be exemplarily addressed in this talk. In detail, latest findings on appropriate focusing conditions, cross-effects with particle-laser interaction, flow conditions, kinetics etc. are discussed.