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Time-resolved X-ray diagnostics of pulsed laser ablation in liquids (PLAL))

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PLAL is a robust technique to produce nanoparticles of a broad choice of materials by ablation with pulsed lasers. When this process takes place inside a liquid, nanoparticles are caught in suspension for further use. Nevertheless the understanding and control of particle yield and morphology is far from being understood.

The complexity of the process originates in the inherent span of timescales from laser-matter interaction on picoseconds up to aging time scales of hours and the interplay of different length scales. The latter involves the confinement of the nascent particles in a transient vapor bubble with a lifetime below milliseconds.

We have analyzed this process with time-resolved methods spanning the nanosecond to second time span by scanning SAXS [1], WAXS, X-ray imaging [2,3], X-ray spectroscopy [3] and optical methods to resolve some of the fundamental structure-formation processes.

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