

# Toward an automated tool for interferogram analysis for real time characterization of plasma density profile in laser produced plasmas

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Laser-driven plasma wakefields accelerators (LWFA) in the past few years have shown rapid progress towards the realization of compact and stable electron sources. Many efforts are devoted to increase the repetition rate of these sources, which is mandatory for their future applications. This requires diagnostics that can work in real-time without losing their precision. This is particularly difficult for the characterization of the plasma density profile, which is crucial for the tuning of the plasma density and the laser properties to reach the optimal match for the acceleration. Interferometry is a widely used method, particularly appreciated since it allows for non-intercepting, single-shot measurements of the local plasma density. Still, the analysis of the raw data is a non-trivial task, prone to many sources of error and dependent on the manual inputs.

In this presentation, we will show an automated tool we are investigating for a fast and operator-independent analysis of the plasma density that could enable a real time feedback of the formed plasma density to help the operation of LWFA at high repetition rate.

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