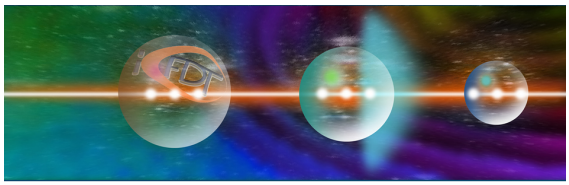

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Multipurpose system of interferometric setups for real-time estimation of plasma and gas density in fusion and particle acceleration experiments at INFN-LNS

Tuesday, 22 October 2024 18:05 (1 hour)

A multi-purpose system of interferometric setups to measure gas and plasma density are being developed at the INFN-LNS facility. First, for the FUSION project, there is the need to estimate proton and alpha stopping power in borated plasma. To this end, we have a modified Nomarski interferometer designed to have sub-nanosecond resolution (100 ps) at the second harmonic of the pump laser, 532 nm. This system has the versatility that shadowgrams and polarimeter measurements can be obtained by simple modifications of the original setup.
For the I-Luce facility we will have different methods for particle acceleration using plasma generated by laser-matter interaction: solid targets for proton acceleration and gas targets for electron acceleration. In each case specific interferometric setups based on Mach-Zehnder configurations are being designed, including a digital holographic microscopic (DHM) system to determine plasma and gas density in capillary and gas jet accelerating architectures. DHM schemes will have the added possibility to explore the full reconstruction of the object wave travelling through the gas/plasma media, including in cases where the plasma container vessels present non-optically uniform walls, like in capillary systems.

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