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Plasma Target Characterisation at FLASHForward

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Precise knowledge of the temporal and spatial evolution of the plasma density within plasma targets is important for realising high quality accelerated beams in plasma wakefield accelerators like FLASHForward. A plasma target characterisation setup was assembled for the purpose of measuring the electrical discharge-generated plasma density in the different types of gas-filled targets used at FLASHForward. Three diagnostics are presently being commissioned: a common-path two-colour laser interferometer for measuring the average longitudinal plasma density with a time resolution of tens of picoseconds; a transversely aligned spectrometer for analysing Stark broadened line emission profiles with the flexibility to measure transverse and longitudinal density profiles with a spatial resolution of tens of microns and a temporal resolution of ~5ns; a transversely aligned Michelson interferometer with a spatial resolution of a few microns and a temporal resolution in the tens of femtosecond regime. A summary of the latest complementary measurements and results is presented.

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