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Characterization of an Expanding Plasma Generated in Laser-Ionized Helium NICHOLAS HARRISON, DAN CRUNKLETON, JUSTIN PEATROSS, SCOTT BERGESON, None — An 800 nm, 35 fs laser pulse is focused using f/20 optics into a jet of helium. The peak intensity exceeding 10^{16} W/cm^2 is well above the ionization threshold for helium. Subsequently, two weak probe pulses, one passing coaxially through the track of ionized plasma and the other to the side, create an interference pattern in the far field to reveal the optical path difference induced by the presence of the plasma. The probe pulses are systematically delayed over several nanoseconds to characterize how the central plasma density decreases as a function of time, owing to radial expansion of the plasma. The expansion rate is tied to the ionized electron temperature as well as the mass of the helium ions. The ion temperature and density place this plasma just inside the strongly coupled plasma regime. We show that the electron temperature increases with ionizing laser intensity.

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None

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