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Temperature and density measurements in laser-produced plasmas.

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Several diagnostics based on electromagnetic radiation are used to measure temperature and density in laser-produced plasmas. They can essentially be grouped in two categories. A first involves the analysis of the emission spectrum from the plasma. The typical temperature of a laser-produced plasma being in 10^4 - 10^5 eV range, most of the emission lies in the ultra-violet to the soft X-ray region, at energies several orders of magnitude greater than the plasma characteristic frequencies. So the detection of such radiation is not complicated by refraction or other collective effects. A second category involves the use of a photon beam probe which propagates through the plasma. In this case the information about plasma parameters are held in the scattered radiation properties. The refraction affecting the probe beam is commonly used in interferometric techniques to retrieve the spatial density distribution of the plasma. Depending on the pulse duration of the laser producing plasma, such techniques can be operated in time resolved mode.

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