

Fiber optic two-color vibration compensated interferometer for plasma density measurements

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Abstract

A fiber optic, heterodyne, two-color interferometer utilizing wavelength division multiplexing (WDM) technology has been developed for measuring electron density in plasmas. Vibration compensation is accomplished via common path 1.31 and 1.55 μm distributed feedback (DFB) laser interferometers. All beam combining, splitting, frequency modulation and collimation is accomplished by shared single-mode fiber optic components. Measurements of an argon radio-frequency generated plasma with electron densities of 10^{20} m^{-3} show effective vibration compensation and typical line density resolution of approximately $2 \times 10^{19} \text{ m}^{-2}$.

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