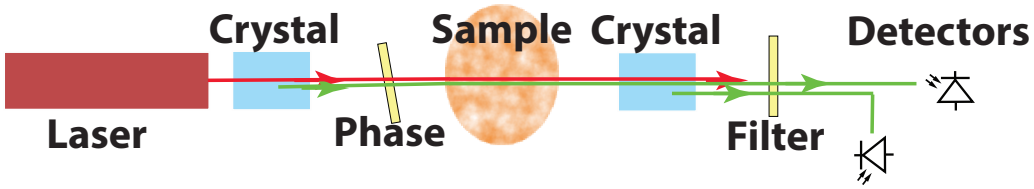
L-Egant Solutions

High-Voltage, Pulsed-Power Components, and Systems:
Solutions for Science, Engineering, and Technology

New Product Offering - June 2019

SECOND HARMONIC INTERFEROMETER



A Second-Harmonic interferometer (SHI), also known as a Dispersion Interferometer, is an optical instrument capable of measuring precisely the densities of plasma, neutral-gas, and other dispersive media. The measurement relies on the use of two, co-linearly propagating laser beams that are dispersed upon passing through the medium. The method eliminates common-mode noise, providing high stability and high sensitivity. The instrument design is simple, low-cost, and easy to maintain. Its primary design features are summarized below:

- The system is compact, comprised of two small, lightweight units (15x15x30cm).
- These units may be mounted directly on the test-chamber structure.
- Vibration isolation systems are typically not needed.
- Initial installation may be completed in a matter of days.
- Re-alignment is straight-forward and may be completed in a few minutes.
- The SHI's high stability allows for pathlengths from mm's to m's to be measured.
- The laser beams are ≈ mm-diameter, providing for high-spatial resolution.
- The measurement is continuous in time, with a bandwidth ≈MHz and resolution ≈μs.
- Phase-shift sensitivities as low as, $\Delta\Phi \geq 10^{-3}$ radians are routine, at the detector limit.
- Software provides for quick-data analysis, enhancing scientific workflow and discovery.
- The density-path integral is, $\int n \cdot dl \geq 10^{14}$ cm^{-2} for plasma, and $\int n \cdot dl \geq 10^{16}$ cm^{-2} for gas. The upper limit density-path integral is estimated to be in the range, $\int n \cdot dl \leq 10^{20}$ cm^{-2}.
- The performance characteristics (i.e., beam power, CW/pulsed output, laser linewidth, detector gain and bandwidth) are application specific, to keep costs low.

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