Optical Delay Scanner

A device involving a low aberration optical delay scanner

Inventors at Georgia Tech have designed an ultra-low aberration, dispersion-free optical delay line. This device generates temporally changing optical light paths that impart time-dependent delays for light pulses. A cylindrical mirror has been employed to create a symmetry axis that can be used to displace light and change its optical path without imparting wave front aberration. The symmetry axis implemented in this invention allows for the generation of delay cycles with extremely low optical aberration.

Summary Bullets

- **Efficient** – provides 10-times lower wave-front aberration than the best comparable dispersion-free delay line
- **Simple** – simplifies the spectroscopic coherent Raman imaging (CRI) approach

Solution Advantages

- **Efficient** – provides 10-times lower wave-front aberration than the best comparable dispersion-free delay line
- **Simple** – simplifies the spectroscopic coherent Raman imaging (CRI) approach

Potential Commercial Applications

- Raman spectroscopy
- Pump-probe optical methods
- Rapid-scan interferometry

Background and More Information

Aberration is the failure of rays to converge at one focus because of limitations or defects in a lens or mirror. Low wave-front aberration is crucial for applications employing interferometry or multi-pulse laser-material interactions. Many linear and non-linear optical methods such as interferometry and pump-probe spectroscopes require optical delay of one light path with respect to the other. The delay line performance requirements vary with application but are still demanding when dealing with broad-spectral ranges and ultrafast pulses. The requirement of matched dispersion for the delayed and reference beam often requires a dispersion-less, free-space arrangement when using spectrally broad light. There is a growing need for a more efficient technology

that provides significantly lower wave-front aberration.

Inventors

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IP Status

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Publications

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