High Throughput Spectrometer

Improvements to Fourier-transform volume holographic spectrometer to decrease size and cost

Georgia Tech inventors have developed improvements to Fourier-transform volume holographic spectrometer, a robust spectrometer design that can be used to detect weak spatially incoherent signals. In this spectrometer, two of the four components are combined into one single spherical beam volume hologram, which disperses an optical signal uniformly over an input place. Combining these components allows for the size and cost of the spectrometer to be drastically reduced. The main concern with this improvement is maintaining the resolution of the spectrometer. This device addresses issues with low resolution and throughput in single spherical beam volume holograms by recording the holograms using three different techniques. This allows for increased throughput while minimizing size and cost.

Summary Bullets

- **Low cost** – decrease in the number of components decreases cost
- **Compact** – decrease in the number of components decreases size
- **High resolution** – improvements in hologram recording maintain high resolutions

Solution Advantages

- **Low cost** – decrease in the number of components decreases cost
- **Compact** – decrease in the number of components decreases size
- **High resolution** – improvements in hologram recording maintain high resolutions

Potential Commercial Applications

- Fourier-transform volume holographic spectrometers
- Biological sensors
- Environmental sensors

Background and More Information

Compact, portable, efficient, and low-cost spectrometers are of high interest in practical sensing applications, especially in biological and environmental sensors. Conventional spectrometers are comprised of four components which are responsible for directing, dispersing, and detecting wavelengths. These four components make the spectrometers bulky, high-cost, and inefficient.

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IP Status

: US7649660B2

Publications

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