Docket #: S17-079

Multi-Wavelength Laser with Perpendicular Polarization

Researchers at Stanford have developed a multi-wavelength laser with perpendicular polarization, which supports easy and independent measurement in various optical sensors for improved accuracy and speed. The need to develop techniques for measuring the distance/direction to an object, identifying an object or terrain, or detecting speed, temperature, and material distribution is driving new research into laser light generation and beam steering. While single wavelength lasers can provide one data signal at a measurement cycle, multi-wavelength lasers can provide multiple signals at one cycle, though a complicated component is typically required for separating the signals. In the new apparatus, the laser cavity (comprising a meta-mirror plus DBR mirror or metal mirror) has two separate resonance modes that have perpendicular polarization and different wavelength. Spectral separation between modes can be controlled by changing meta-mirror geometry.

Related Technologies:
Stanford docket S17-078 - **Mechanically Tunable Metasurface for Optical Modulation, Beam Steering**
Describing a metasurface with high reflectance and large phase modulation for use as optical phase modulators or beam steering device (Lidar).

Stanford docket S17-263 - **Holographic Beam Steering Device**
Describing a highly efficient (>90%) holographic beam steering method for obtaining distance information of objects nearby, with applications from autonomous vehicles to home appliances.

Stanford docket S17-487 - **Metasurface Micro-Cavity for OLED Color Purity**
Describing a simpler and low-cost micro-cavity design for color tuning of organic light emitting devices (OLEDs) for display applications.

Stanford docket S18-193 - **High-Efficiency Broad-Angle Dielectric Diffraction Grating**
Describing a dielectric diffraction grating that provides high (near-unity) diffraction efficiencies in an ultra-compact volume. With applications in a variety of optical systems such as telescopes and VR.

Stanford docket S18-495 - **Metasurface Display for Augmented and Virtual Reality**
Describing a near-eye display enabling both Augmented Reality (AR) and Virtual Reality (VR) modes with dynamically controlled contrast.

Applications

- Medical and healthcare optical sensors (e.g., glucose non-invasive sensing, electrocardiogram)
- Adoptable for both optically pumped and electrically driven lasers

Advantages

- Multi-color laser source can give higher accuracy in optical sensors
- Supports easy and independent measurement in various optical sensors

Patents

- Issued: 10,615,561 (USA)

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