LICENSING OPPORTUNITY: ADVANCED HEAT-BASED SENSOR FOR DETECTING LIGHT AND ENERGY ACCURATELY

DESCRIPTION

Problem

Traditional bolometers only detect temperature changes from absorbed infrared radiation and require external calibration for accurate power measurements. Their narrow-band nature limits their effectiveness for broader applications. Conventional electrical substitution radiometers are large and complex, making miniaturization impractical. This invention solves these limitations by providing a radiometer that directly measures power without calibration and can be scaled down for array-based applications.

Invention

This invention introduces a broadband electrical substitution radiometer that measures radiation across a wide spectrum without requiring external calibration. It consists of a thermal isolation platform, an electrical thermometer-heater, and an optical absorber, enabling highly accurate radiometry. The radiometer can be integrated into an array, making it suitable for imaging applications. By using electrical substitution techniques, it directly equates absorbed radiation power to electrical power, allowing for precise measurements. The compact design enables miniaturization and integration into focal plane arrays.

BENEFITS

Potential Commercial Applications

This technology can improve infrared imaging, thermal sensing, and scientific radiometry applications. It is useful in environmental monitoring, medical diagnostics, and satellite-based radiation measurements. The broadband functionality enhances security and defense systems, where accurate thermal imaging is critical. Industrial applications include precision manufacturing and quality control, particularly in materials inspection.

Competitive Advantage

- Broadband Operation: Works across a wide range of wavelengths, unlike conventional narrowband bolometers.
- Calibration-Free: Directly measures power using electrical substitution, removing the need for external calibration.
- Miniaturization: Can be integrated into arrays, making it ideal for advanced imaging applications.
- Higher Sensitivity: Thermal isolation design improves measurement accuracy compared to traditional radiometers.

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