Broadband Optical Rotary Junction with High Return Loss for Analysis of Plaques

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ABSTRACT

Researchers at the University of California, Davis have developed an intravascular catheter system that integrates Fluorescence Lifetime Imaging (FLIm) with Polarization-Sensitive Optical Coherence Tomography (PS-OCT) for advanced plaque assessment in coronary artery disease.

FULL DESCRIPTION

This intravascular catheter system merges the capabilities of FLIm and PS-OCT to offer a comprehensive multi-scale analysis of plaque structure and biochemical composition. It enables high-resolution morphological imaging, tissue microstructure analysis via polarimetry, and biochemical composition assessment without the need for any molecular contrast agents. The system is designed with a low profile and high-speed imaging capabilities, making it suitable for clinical research and diagnosis in cardiology.

APPLICATIONS

- Advanced diagnostic tools for coronary artery disease.
- Research tools in interventional cardiology for evaluating new treatment modalities.
- Enhanced plaque characterization for the prevention of acute coronary syndromes.

FEATURES/BENEFITS

- Possesses comprehensive multi-scale assessment of plaque features.
- Enhances high-resolution imaging combined with biochemical composition analysis.
- Introduces a low-profile catheter design suitable for percutaneous coronary intervention.
- Mitigates cardiac motion artifacts with high-speed imaging capability.
- Enables simultaneous acquisition of co-registered data across multiple spectral bands.
- Broadens limited assessment capabilities compared to existing intravascular imaging technologies.
- Enables simultaneously capturing detailed morphological and biochemical plaque features.
- Does not require molecular contrast agents needed for traditional imaging modalities.
- Paves the way for new treatment modalities for CAD.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

atherosclerosis, cardiovascular, FLIm, imaging, intravascular catheter, OCT, plaque characterization, PS-OCT, spectroscopy, tissue microstructure

CATEGORIZED AS

- **Medical**
- Imaging

RELATED CASES

2024-558-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Fabrication Method for Side Viewing Miniature Optical Elements with Free-Form Surface Geometry
- Real-Time Fluorescence Lifetime Tracking
- Volumetric Optical Coherence Tomography using a Passively Scanned Probe
- Motor Drive Unit for Combined Optical Coherence Tomography and Fluorescence Lifetime Imaging of Intraluminal Structures
- Interferometric Near Infrared Spectroscopy and Fluorescence Lifetime Imaging

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