Methods and Apparatus for Confocal Endoscopes

Title: Methods and Apparatus for Confocal Endoscopes

Invention: Researchers at the University of Arizona have designed a hyperchromatic objective lens system for use in chromatic confocal microscopy. Advantageously, the use of fewer components for the objective lens may reduce the cost, size, and complexity of the microscopy optics, which can make the chromatic confocal microscope system suitable for endoscopic devices.

Background: In confocal microscopes and confocal endoscopes, multiple images (e.g., en face images) can be acquired at different imaging depths while axially translating the confocal microscope relative to the specimen. This approach of conducting mechanical axial scanning, however, can have difficulties such as in confocal endoscopic imaging of human internal organs, since 1) implementing a precision translation mechanism is challenging in a small endoscope and 2) tissue movement can hamper accurate placement of the imaging depth. Chromatic confocal microscopy can use longitudinal chromatic aberration of the microscope optics to generate different focal planes for different wavelengths and generate cross-sectional confocal images of the specimen without conducting axial scanning of the objective lens.

Applications:
- Confocal Endoscopy
- Confocal Laser Endoscopy
- Optical biopsies

Advantages:
- Fewer parts
- Smaller size
- Less expensive
• Less complex

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