

Title and Scheme: Holographic Interferometry

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Introduction

What is it holographic interferometry?

Holographic interferometry is a powerful optical technique that combines the principles of holography and interferometry.

- **Holography:** The science and practice of making holograms, which are three-dimensional recordings of a light field.
- **Interferometry:** A family of techniques in which waves, usually electromagnetic waves, are superimposed, causing the phenomenon of interference in order to extract information.

This presentation will explore the fundamental concepts behind holographic interferometry and its diverse applications.

Interferometry

Interferometry: The Basics

This section will cover the fundamental principles of interferometry.

- Wave superposition
- Coherence requirements
- Types of interferometers (e.g., Michelson, Mach-Zehnder)
- Applications in metrology

Holography

Holography: Recording 3D Information

This section will delve into the world of holography.

- Recording process (interference and diffraction)
- Reconstruction process
- Types of holograms (e.g., transmission, reflection)
- Key differences from traditional photography

Physics of Holographic Interferometry

Here, we will combine the concepts and explore the underlying physics.

- Double-exposure method
- Real-time method
- Time-averaged method
- Fringe formation and interpretation
- Sensitivity and measurement capabilities

Industrial Applications

This section will showcase the practical uses of holographic interferometry.

- Non-destructive testing (NDT)
- Stress and strain analysis
- Vibration analysis
- Flow visualization
- Surface contouring and deformation measurement

Conclusion

A summary of the key concepts presented.

- Recap of holographic interferometry principles
- Advantages and limitations
- Future outlook and potential advancements