Wavefront Control in Optical Receiver Systems

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PROBLEMS OF INTEREST
- Optical wave propagation through atmosphere
- Adaptive beam control

RESEARCH ISSUES
- System architecture
- Control algorithms
- Numerical models
- System performance: resolution, efficiency, field-of-view, ...

APPLICATIONS
- Directed energy
- Laser communication
- Astronomy
- Atmospheric and underwater imaging

APPROACH
- Analytical analysis
- Numerical simulations
- Experimental study

CONTROL ALGORITHMS

SPGD System
- Wavefront corrector
- Gradient estimator
- Controller

D-SPGD System
- Wavefront corrector
- Corrected wave
- Controller

NARROW FIELD-OF-VIEW ADAPTIVE RECEIVER SYSTEM

System Architecture

Extended Field-of-View Adaptive Receiver System

Multi-reference (MR) D-SPGD Systems

Representative Results

Impact of intensity scintillation

Resolution vs. efficiency

Interference patterns of residual phase after 40 iterations

Impact of turbulence strength and propagation distance

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