

Physics 511

Interferometry in Experimental Physics

Classical Interferometry

- Brief introduction and review of optical Interferometry
- Michelson Interferometry test of Lorentz Invariance
- Michelson Interferometry test of the "5th force"

Radio and Stellar Interferometry

- Gravitational deflection of light
- Very long baseline Interferometry
- Hanbury-Brown-Twiss effect

Photon correlations, quantum optics

- Photon Bunching
- Anticorrelation effects

Interferometric Gravity Wave detectors

- "Bar" experiments
- LIGO

Quantum Interferometry with Matter Waves

- Neutron Interferometry - gravitationally induced quantum interference
- Rotation of spin 1/2 wave functions (neutrons)
- Sagnac effect and detection of absolute rotation using neutrons
- Interaction-free measurements
- Atom Interferometry
- Quantum eraser

Using Interferometry to measure tunneling times

Tests of the fundamentals of Physics

- Einstein-Podolsky-Rosen experiments
- Kaons
- Neutrino oscillations and Mikheyev-Smirnov-Wolfenstein (MSW) effect
- Neutron Electric Dipole Moment (edm)

Multiparticle Interferometry

Quantum Cryptography