Cavity optics

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(~ 20 pages)

1. Introduction (0.5 p)

2. Optical modes (~ 7 p)

2.1 Approximate solution of the wave equation (1.5 p)

2.2 Fundamental mode (propagation laws, gaussian parameters, etc...with figures) (2 p)

2.3 Higher-order modes (Gouy phyase, Hermite-modes, Laguerre-Gaussian modes etc...with figures) (~ 2.5 p)

2.4 Hints on non-spherical beams (~1 p)

3. Fabry-Perot cavities (~ 12.5 p)

3.1 Main equations, properties and definitions (free spectral range, finesse, stability,...) (3 p)

3.2 Matching and alignment of a Fabry-Perot cavity (1.5 p)

3.3 Fabry-Perot cavities as the core of GW interferometers (interferometer arms, signal recyling, power recycling, equations, etc..) (3 p)

3.4 The Pound-Drever-Hall technique (concepts, equations, frequency stabilization,...) (2 p)

3.5 Fabry-Perot cavities as mode-cleaners (1 p)

3.6 Fabry-Perot cavities as frequency and amplitude noise filters (2 p)