Non Reflective Coatings

\[ n_f < n_g \quad t = \frac{1}{4} \lambda = \frac{1}{4} \frac{\lambda_0}{n} \]

Phase shift at each reflection is no relative \( \pi \) phase shift.

Constructive interference \( 2t = m\lambda \)

Destructive interference \( 2t = (m+\frac{1}{2})\lambda \)

\[ 2t = \frac{1}{2} \lambda \implies t = \frac{1}{4} \lambda \quad \text{no reflection.} \]

e.g. coating \( \text{MgF}_2 \) \( n = 1.38 \) \( \lambda_0 = 550 \text{nm} \)

\[ t = \frac{1}{4}(\frac{\lambda_0}{n}) = \frac{1}{4} \frac{550}{1.38} = 400 \text{nm} \]
Michelson Interferometer

If $L_1 = L_2$, virtual image of $M_1$ coincides with $M_2$.

$\Delta y = \frac{\lambda}{2}$ fringes shift to left by fringe separation.

$m$ fringes move

$\Delta y = m \frac{\lambda}{2} \Rightarrow \lambda = \frac{\Delta y \cdot 2}{m}$ accurate wavelength measurement.

Michelson Morley Expt: $\Delta L = \pm \frac{2L \cdot v^2}{c^2}$ if there is an "ether" not observed.