

54. According to Eq. 36-41, the number of fringes shifted (ΔN) due to the insertion of the film of thickness L is $\Delta N = (2L/\lambda)(n - 1)$. Therefore,

$$L = \frac{\lambda \Delta N}{2(n - 1)} = \frac{(589 \text{ nm})(7.0)}{2(1.40 - 1)} = 5.2 \mu\text{m} .$$