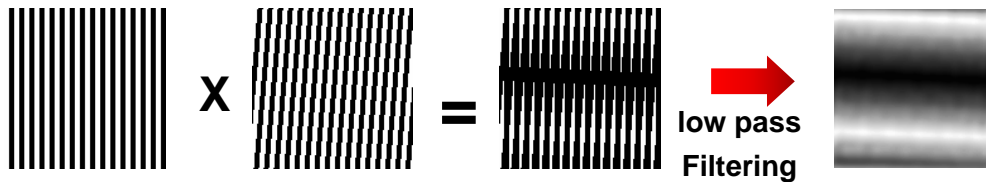

Measurement of Refractive Index by Phase-Shifting Moiré Deflectometry

Phase-Shifting Moiré technique

Generation of Moiré fringe



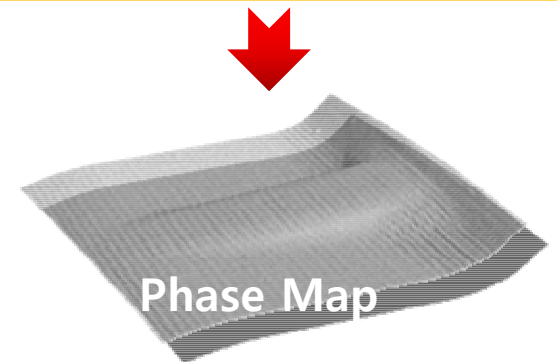
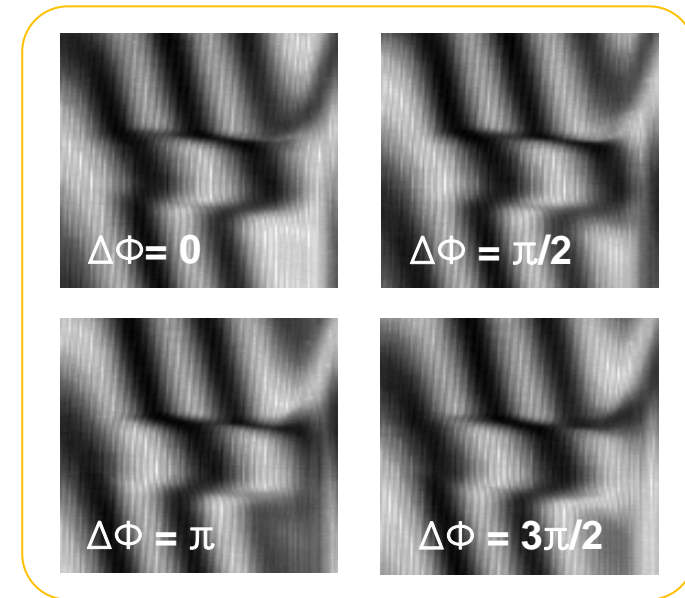
Phase Shifting Interferometer

Let light intensity have a cosinusoidal distribution and intensity distributions have initial phase difference of $\pi/2$:

$$\begin{aligned} I_0(x, y) &= B(x, y) + A(x, y) \cos(\phi(x, y) + \phi_0) \\ I_1(x, y) &= B(x, y) + A(x, y) \cos(\phi(x, y) + \phi_0 + \pi/2) \\ I_2(x, y) &= B(x, y) + A(x, y) \cos(\phi(x, y) + \phi_0 + \pi) \\ I_3(x, y) &= B(x, y) + A(x, y) \cos(\phi(x, y) + \phi_0 + 3\pi/2) \end{aligned}$$

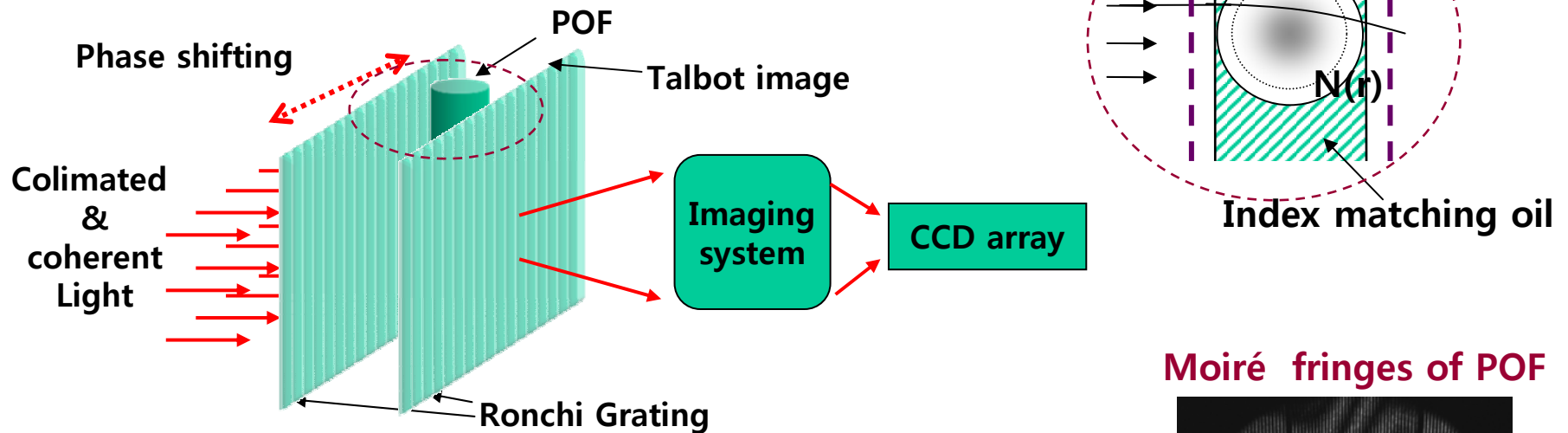
We can get $\phi(x, y) + \phi_0$ from these four distributions (I_0, I_1, I_2, I_3) using the properties of trigonometric function :

$$\phi(x, y) + \phi_0 = \tan^{-1}\left\{ \frac{I_1 - I_3}{I_0 - I_2} \right\}$$



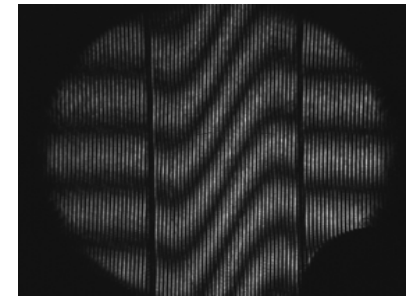
Moiré technique in Refractive index Measurement

Measurement Set-up



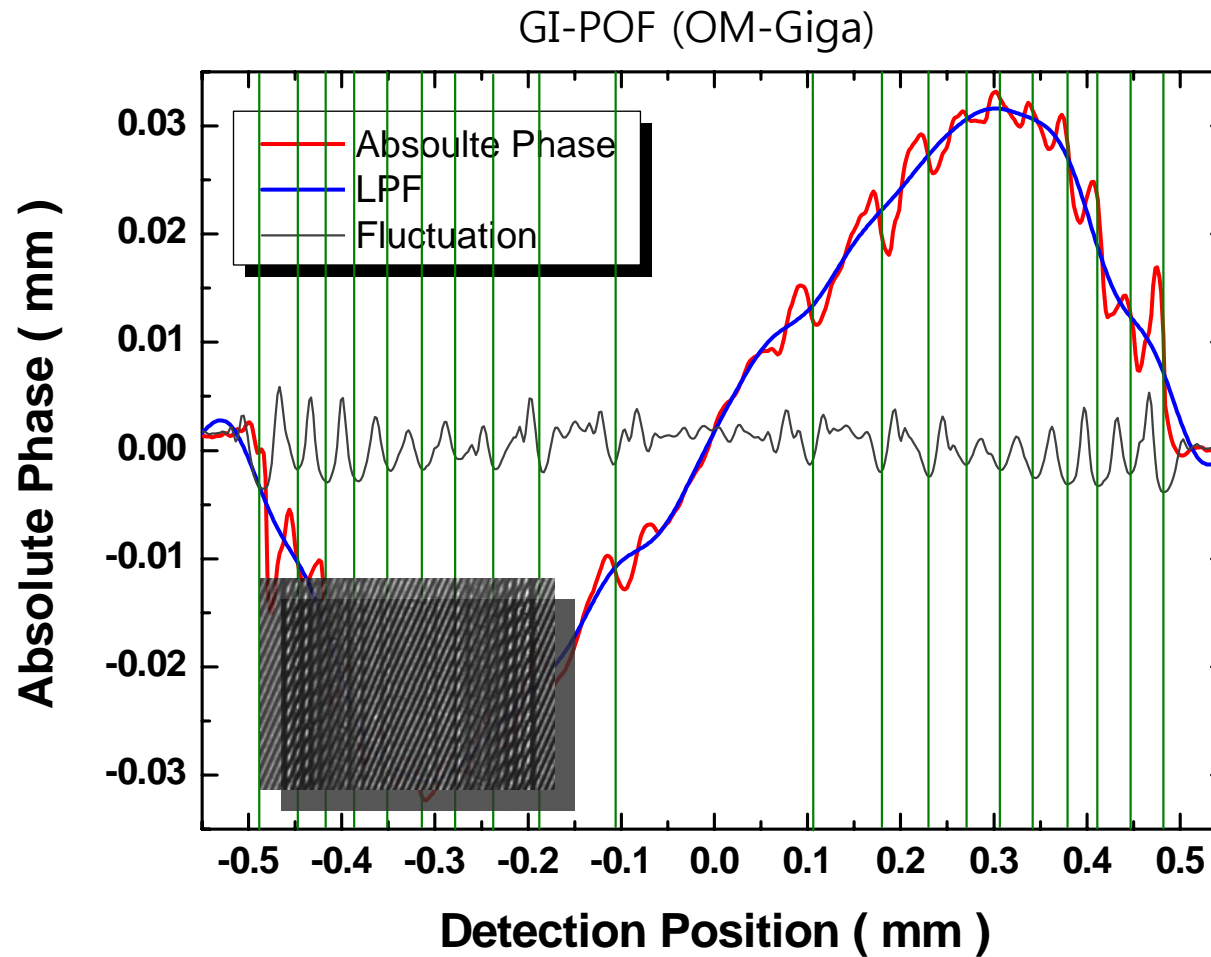
Phase Information ↔ Refractive index Profile

Moiré fringes of POF



Measurement of Refractive index

➤ Measured Images and Phase



Measurement of Refractive index

➤ Profiles of Refractive index

