Retardation Measurement System

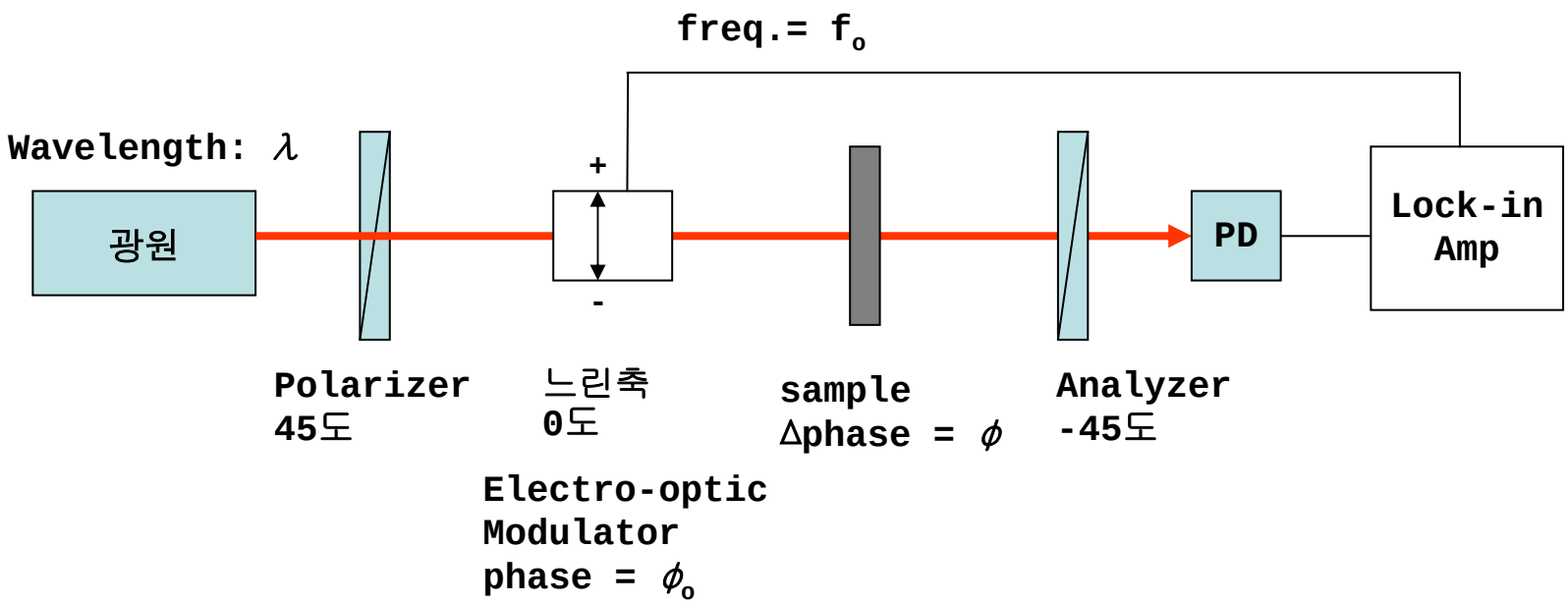
for thin film material

REMS-100

Sesim

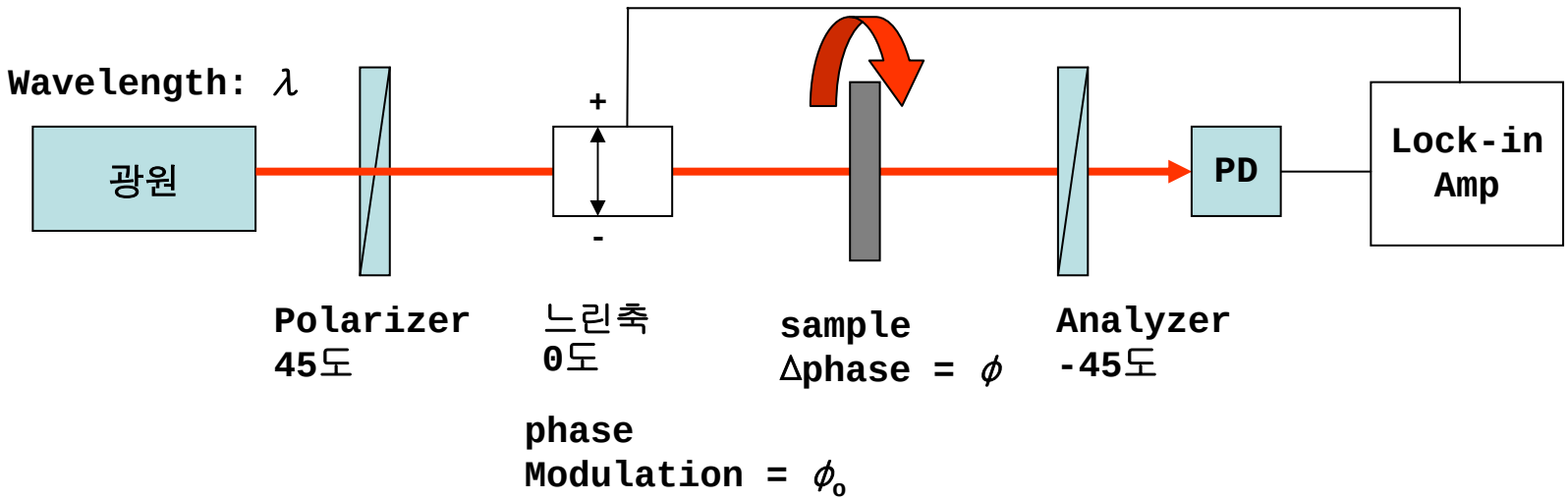
Sesim Photonics Technology Co. Ltd.
http://www.sesimlcd.co.kr

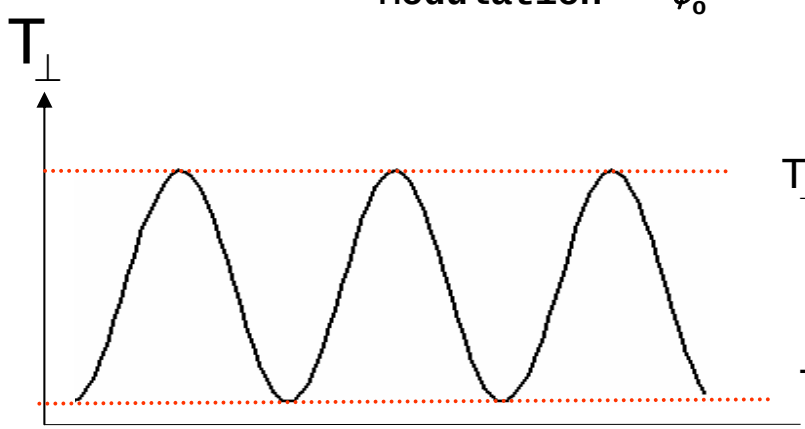
Measurement principle : Retardation



Measurement principle : 측정

- sample을 돌려가면서 투과도 측정.





$$T_{\perp MAX} = A \sin^2\left[\frac{(\varphi_o + \varphi)}{2}\right]$$

$$T_{\perp MIN} = A \sin^2\left[\frac{(\varphi_o - \varphi)}{2}\right]$$

sample의 회전각

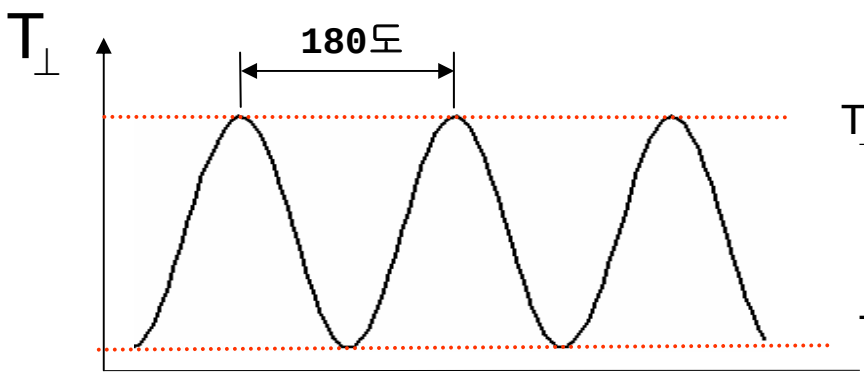
Measurement principle : Retardation 결정

- φ_0 를 알면 투과도의 최대/최소값을 결정할 수 있다.
  단점, 1. φ_0 이 온도에 따라 변한다.
  2. 최대/최소값을 정확하게 결정하기 어렵다.

=> 측정은 단순하나 오차가 크다.

- $T_\perp = T_\perp(\theta; \varphi_0, \varphi, A)$

  $T_\perp$ 를 θ 에 따라 fitting한다.

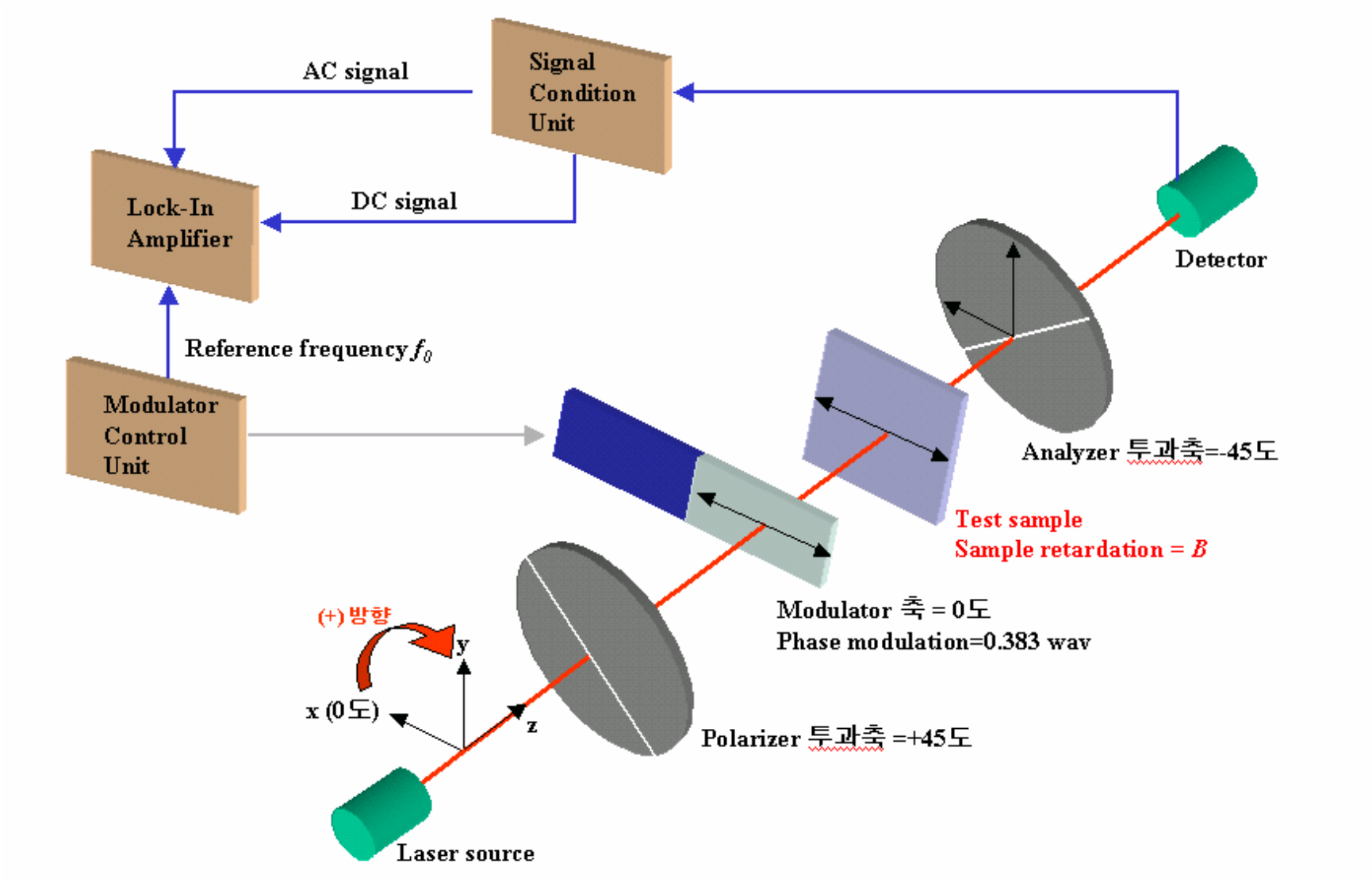


$$T_{\perp MAX} = A \sin^2 \left[(\varphi_0 + \varphi)/2 \right]$$

$$T_{\perp MIN} = A \sin^2 \left[(\varphi_0 - \varphi)/2 \right]$$

sample의 회전각

System Block Diagram



Sample : Alignment layer

REMS-100

File Comm Set-Up Help

Information

Operator	
Date	2004-12-29
Sample ID.	

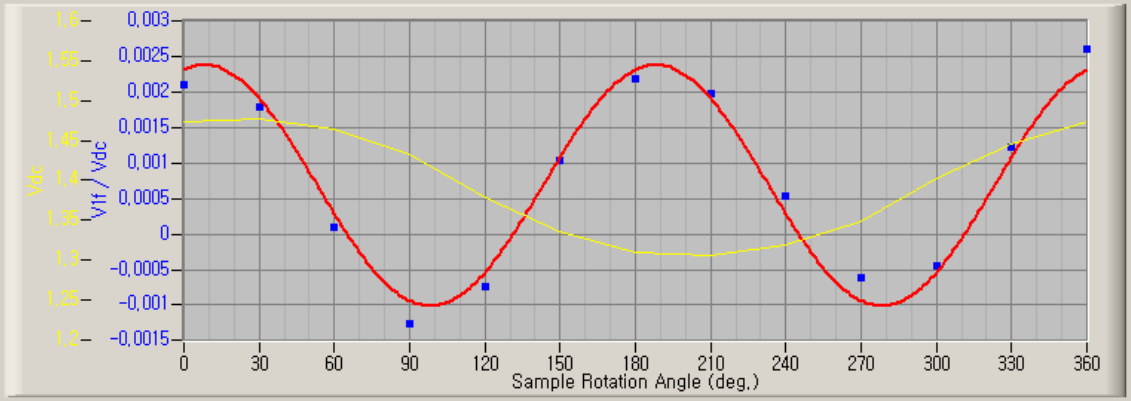
Modulator & SCU

Wavelength	632.8 nm
Retardation	.383 wav
Operation mode	Input. AC
Time Constant	2 ms
AC Gain	3.
DC Gain	10.

Lock-In Amplifier

Ref. Frequency	50.076 kHz
Ref. Phase	43.853 D
Ref. Source	External
Ref. Slope	TTL Rise
Harmonic	1
Source	A
Grounding	Float
Coupling	AC
Line Notches	1X/2X Line
Sensitivity	500 mV
Time Constant	3 ms
Filter	24 dB/oct.
Synchronous	Off

Phase Scale



Fitting Measure

Rotation No.	10
Step angle (deg.)	30
Rotation angle (deg.)	360.0
V1f/Vdc	2.605e-03
Elapsed Time (mm:ss)	09:42
Birefringence (nm)	0.1637
(deg.)	0.0931
Optic axis (deg.)	9.55

Analysis function Apply

Birefringence (nm) 0.001

No.	Biref. (nm)	Biref. (deg.)	Optic axis (deg.)
1	0.1557	0.0886	8.98
2	0.1631	0.0928	9.70
3	0.1611	0.0916	10.08
4	0.1612	0.0917	10.84
5	0.1663	0.0946	10.33
6	0.1692	0.0963	10.26
7	0.1646	0.0936	7.99
8	0.1638	0.0932	9.74
9	0.1671	0.0950	9.36
10	0.1646	0.0937	8.20
Avg.	0.1637	0.0931	9.55
Min.	0.1557	0.0886	7.99
Max.	0.1692	0.0963	10.84
Delta	0.0135	0.0077	2.85
Std.	0.0036	0.0020	0.88

2004-12-29 | Motor | PEM-90 | Lock-In