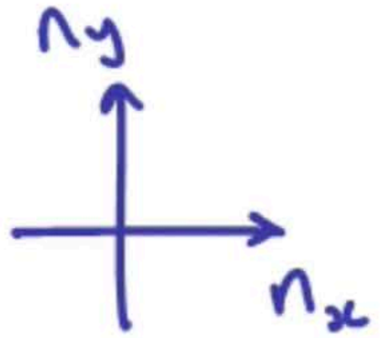
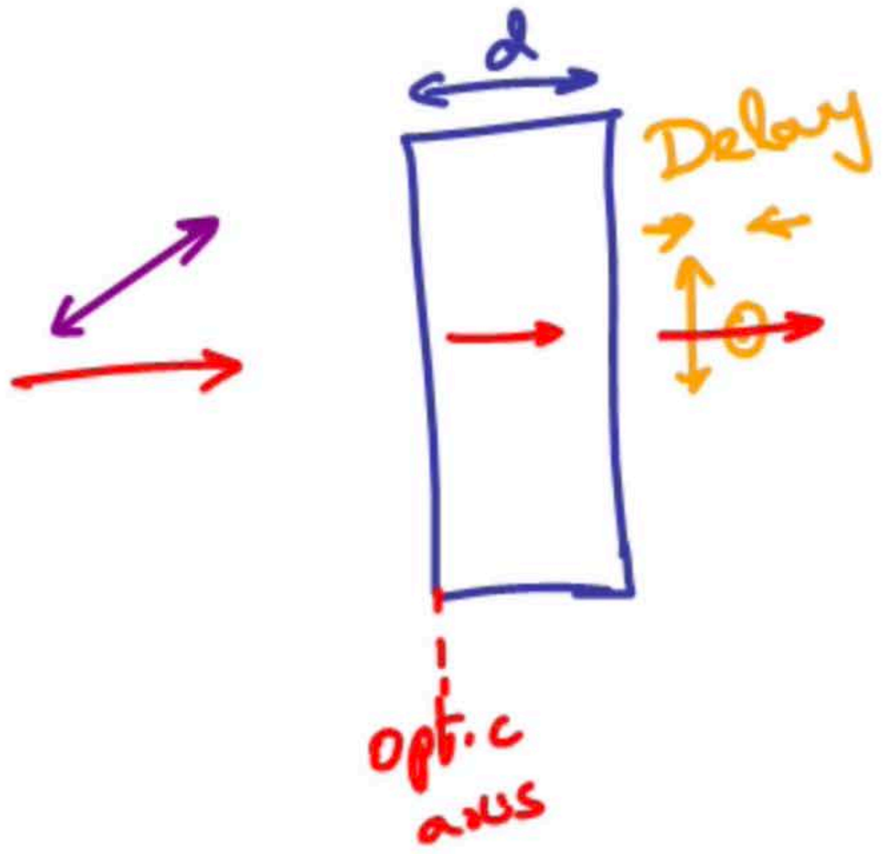




Phase retardation, $\phi = \frac{2\pi}{\lambda}(n_e - n_o)\, d$

Input

$$\left(\hat{a}_x E_x + \hat{a}_y E_y e^{j\phi}\right)$$

$\phi = 0 \Rightarrow$ Linear

If $\phi = \pi/2$

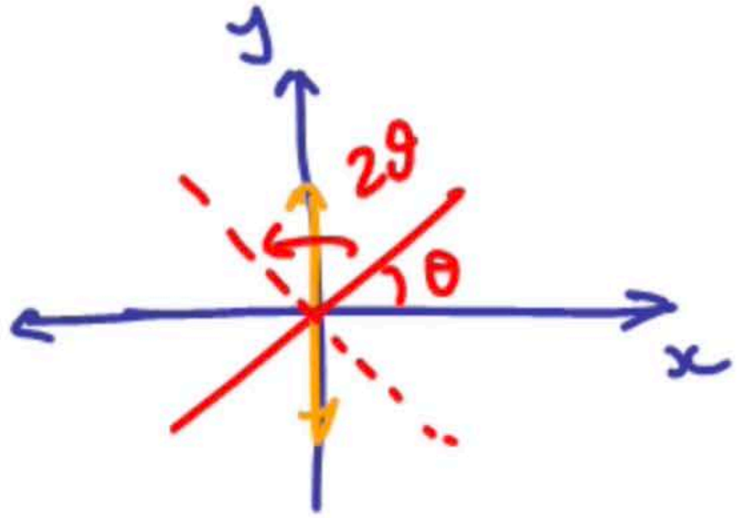
Quarter Wave Plate

$$\hat{a}_x E_x + \hat{a}_y E_y e^{j\pi/2}$$

Left

If $E_x = E_y$, $\phi = \pi/2 \Longrightarrow$ Circular Polarization

$\theta = 45^\circ$



If $\phi = \pi$

Half wave plate

$$\hat{a}_x E_x + a_y \hat{E}_y e^{j\pi}$$

$$= \hat{a}_x E_x - \hat{a}_y E_y$$

Polarization Rotator

Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Total
Average	0.00	0.89	0.83	0.39	0.94	2.67	4.33	10.06

Marks & Attendance - Excel

File | Home | Insert | Page Layout | Formulas | Data | Review | View | Tell me what you want to do...

A1 | Group No

	A	B	C	D	E	F	G	H	I	J	K	L
1	Group No	Roll No	Name	Quiz I	Quiz II	Lab	Tut	Final	Total			
20												
21			Average	4.97	10.06	8.03			23.06			
22												
23												
24												
25												
26												
27												
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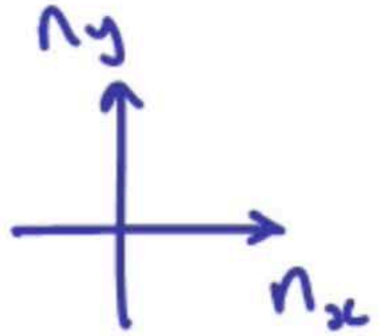
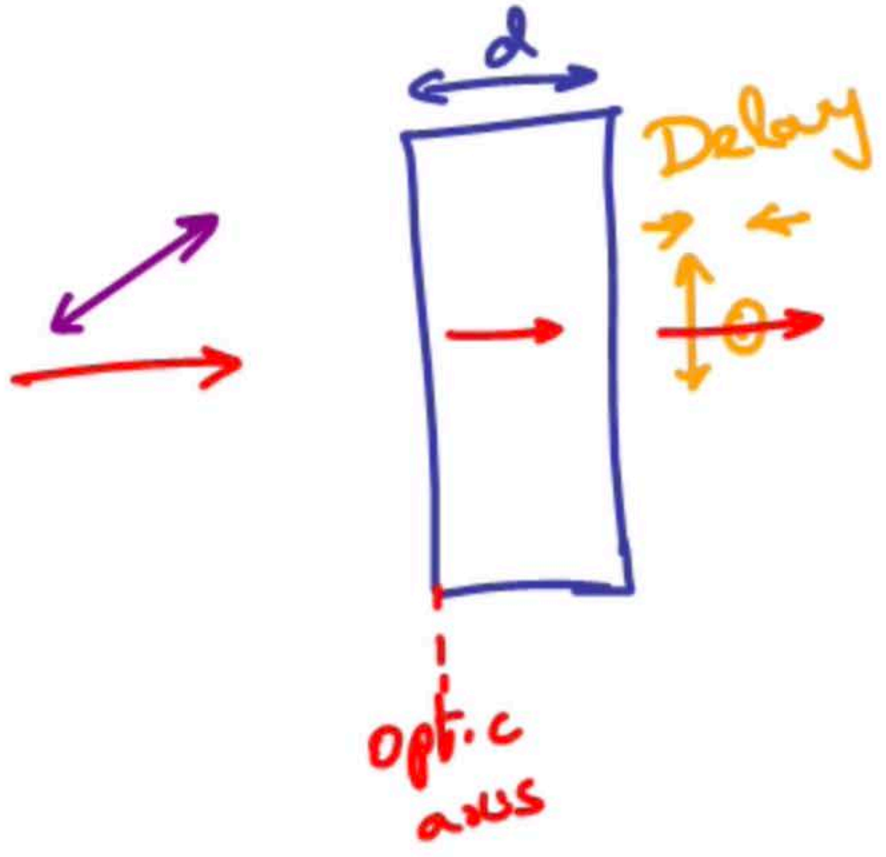
36												

Lab | Quiz I | Quiz II | Tutorial | **Total Marks** | Attendance

Ready



Phase retardation, $\phi = \frac{2\pi}{\lambda}(n_e - n_o)\, d$



$$\left(\hat{a}_x E_x + \hat{a}_y E_y e^{j\phi}\right)$$

Input
$\phi = 0 \Rightarrow$ Linear

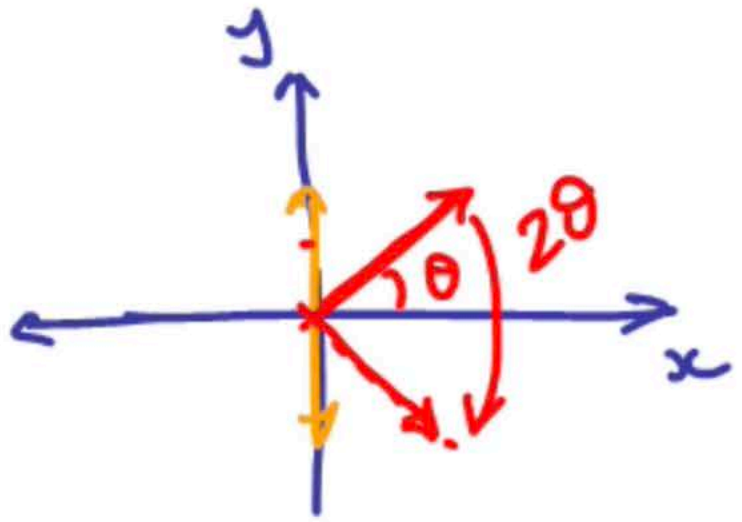
If $\phi = \pi/2$

Quarter Wave Plate

$$\hat{a}_x E_x + \hat{a}_y E_y e^{j\pi/2}$$

Left

If $E_x = E_y$ ($\theta = 45°$), $\phi = \pi/2 \Rightarrow$ Circular Polarization



If $\phi = \pi$

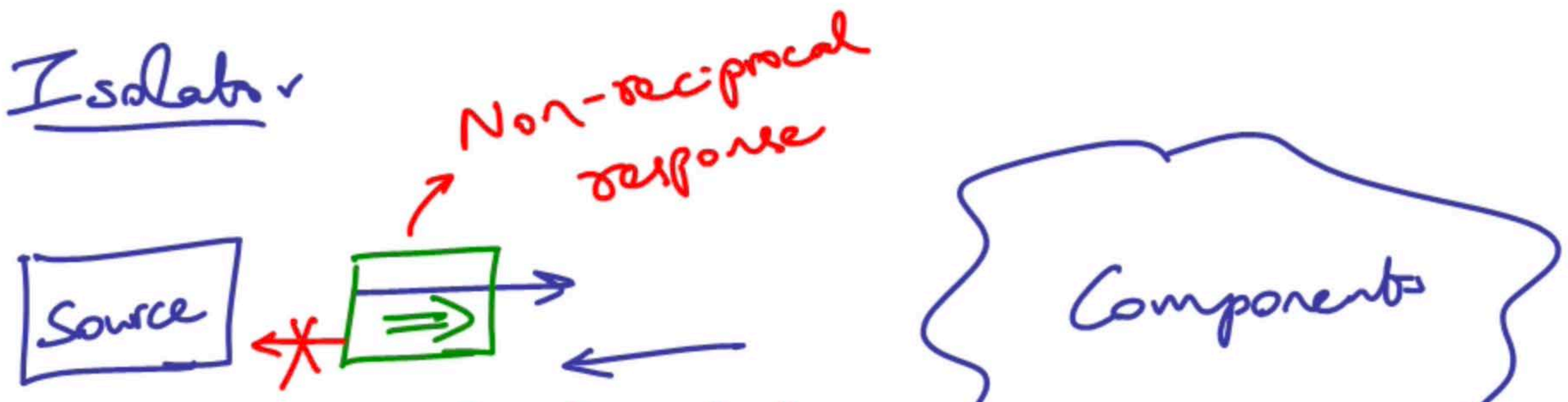
Half wave plate

$$\hat{a}_x E_x + a_y \hat{E}_y e^{j\pi}$$

$$= \hat{a}_x E_x - \hat{a}_y E_y$$

Polarization Rotator

Optical Isolator

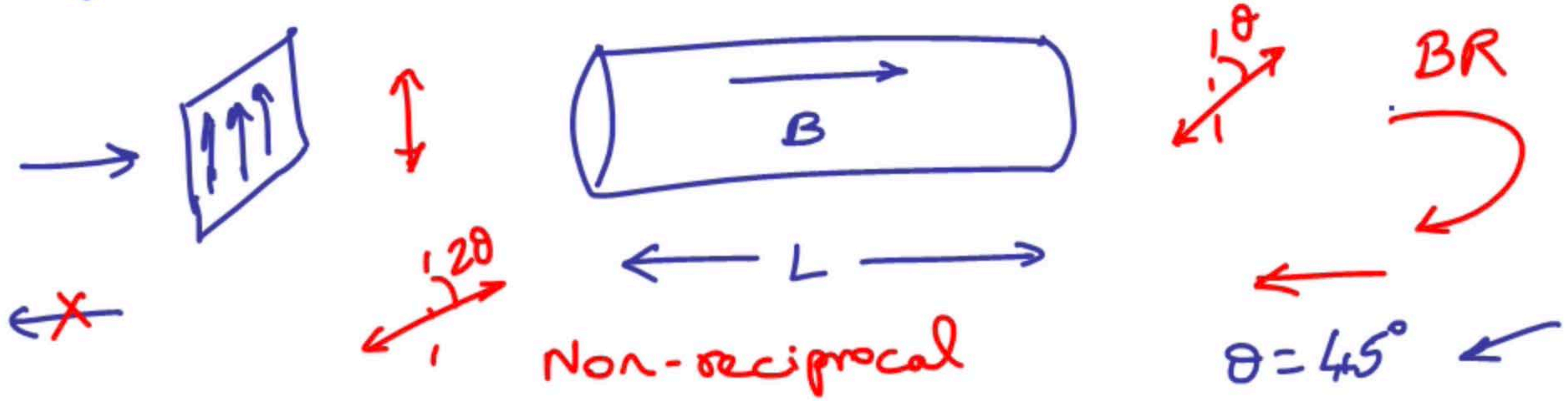


backreflection leads to power/spectral instability of laser

Faraday Effect

$$\vec{D} = \epsilon \vec{E} + j \epsilon_0 \gamma (\vec{B} \times \vec{E})$$

γ → Magneto-gyration coeff.



$$\theta = -\frac{\pi \gamma}{\lambda_0 n_0} B . L$$

$$\boxed{\theta = V B L}$$

V → Verdet const.

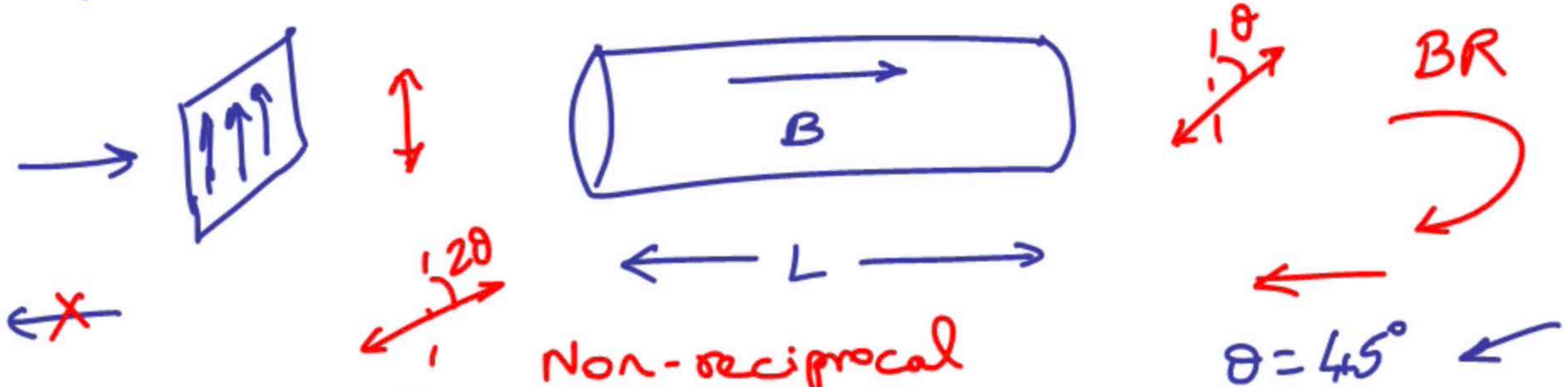
backreflection leads to power/spectral instability of laser

$$\vec{D} = \epsilon \vec{E} + j \epsilon_0 \gamma (\vec{B} \times \vec{E})$$

$\gamma \rightarrow$ Magneto-gyration coeff.

Faraday Effect

Polarization-sensitive Isolator



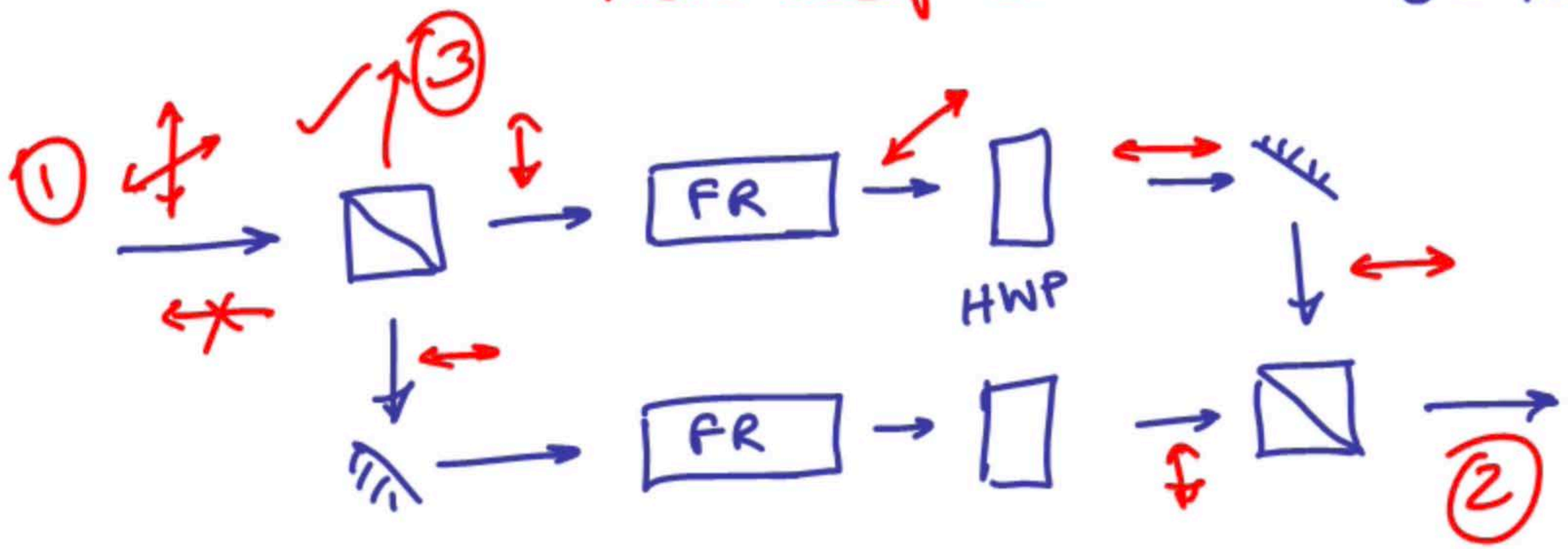
$$\theta = -\frac{\pi \gamma}{\lambda_0 n_0} B.L$$

$$\boxed{\theta = VBL}$$

$\theta = 45^\circ$

$V \rightarrow$ Verdet const.

Polarization-insensitive Isolator



① → ② → ③

Circulator