Semiconductor Ring Laser Gyroscope

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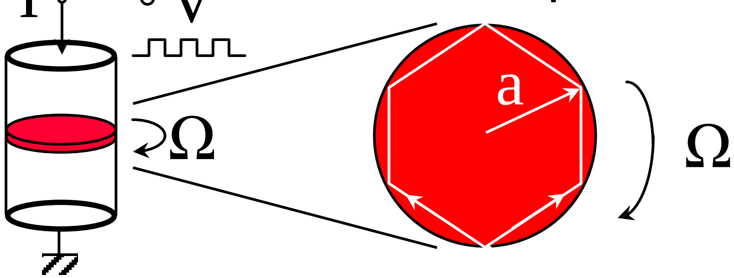
Osci. Freq.: f_l, f_r



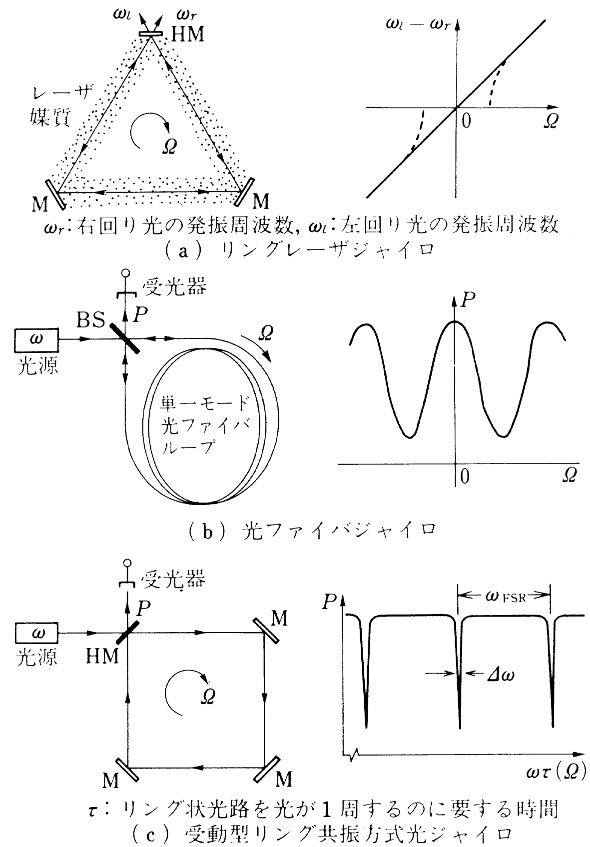
上面図

$$\left| f_l - f_r \right| = \frac{2a}{\lambda} \Omega$$

- Voltage → Signal
- No Outside Light Emission

Electronic Device Using Light

Conventional



Calculated Signal Voltage

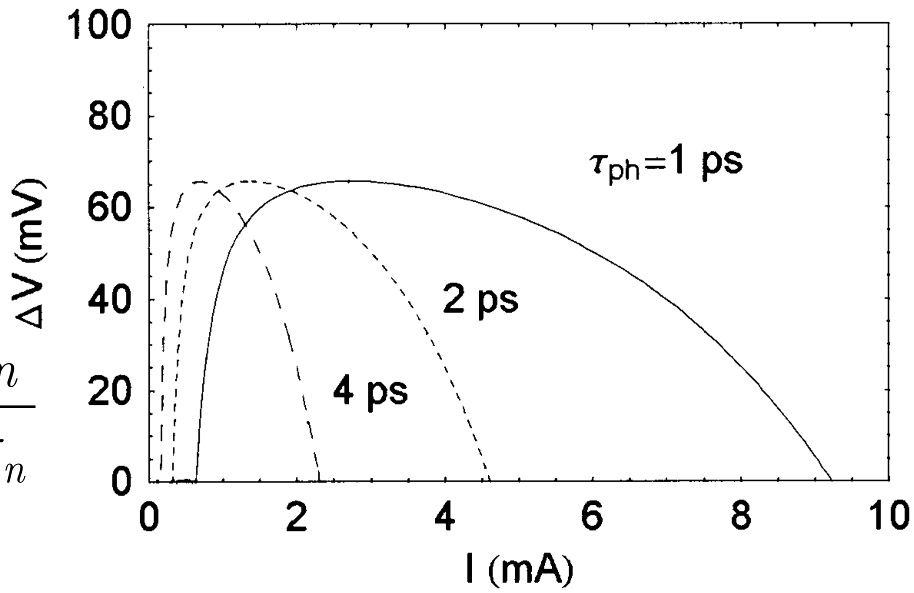
Analysis Using Rate Equations

$$\frac{dS_1}{dt} = G_1(n)S_1 + \beta_{sp}\frac{n}{\tau_r} - \frac{S_1}{\tau_{ph1}}$$

$$\frac{dS_2}{dt} = G_2(n)S_2 + \beta_{sp}\frac{n}{\tau_r} - \frac{S_2}{\tau_{ph2}}$$

$$\frac{dn}{dt} = \frac{I}{eV_a} - G_1(n)S_1 - G_2(n)S_2 - \frac{n}{\tau_n}$$

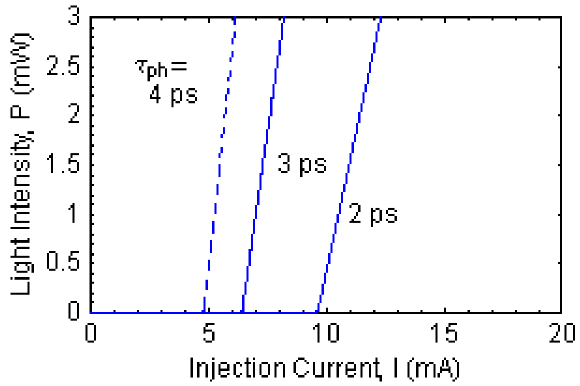
$$n = n_i \exp(eV / 2k_B T)$$



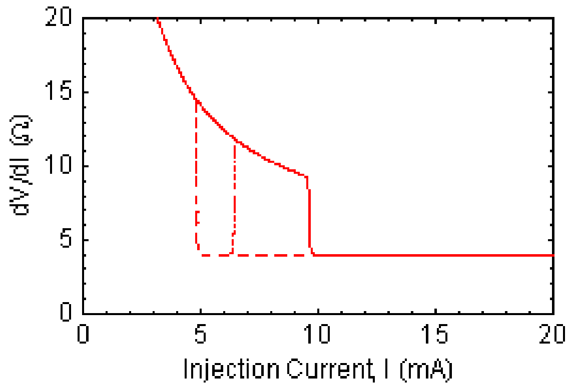
T. Numai, "Analysis of signal voltage in a semiconductor ring laser gyro," IEEE J. Quantum Electron., vol.36, pp.1161-1167 (2000)

Detection of Threshold Current by Voltage

I-*L* Curve (Calculated)



I-(d*V*/d*I*) Curve (Calculated)



Experimental Result