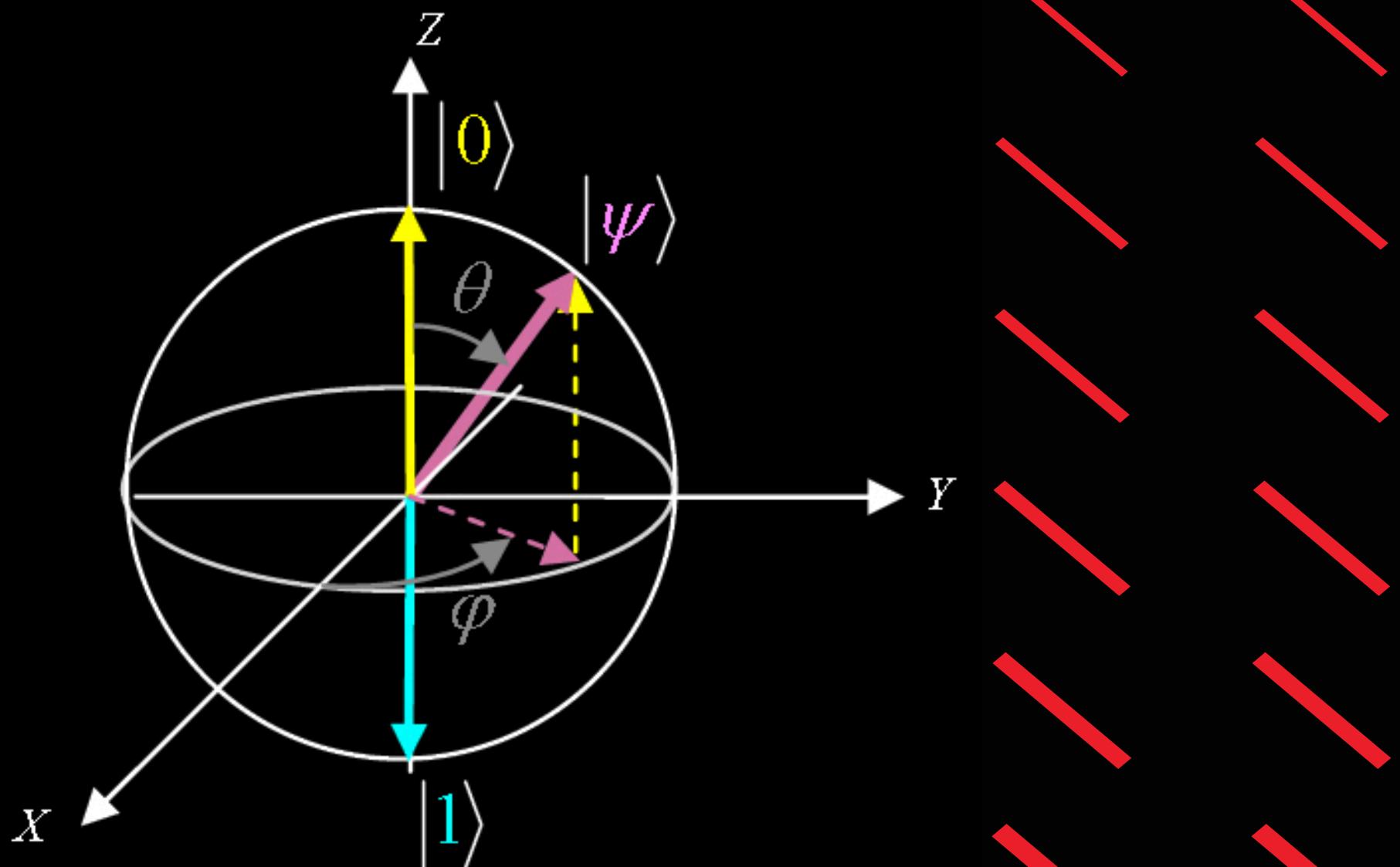
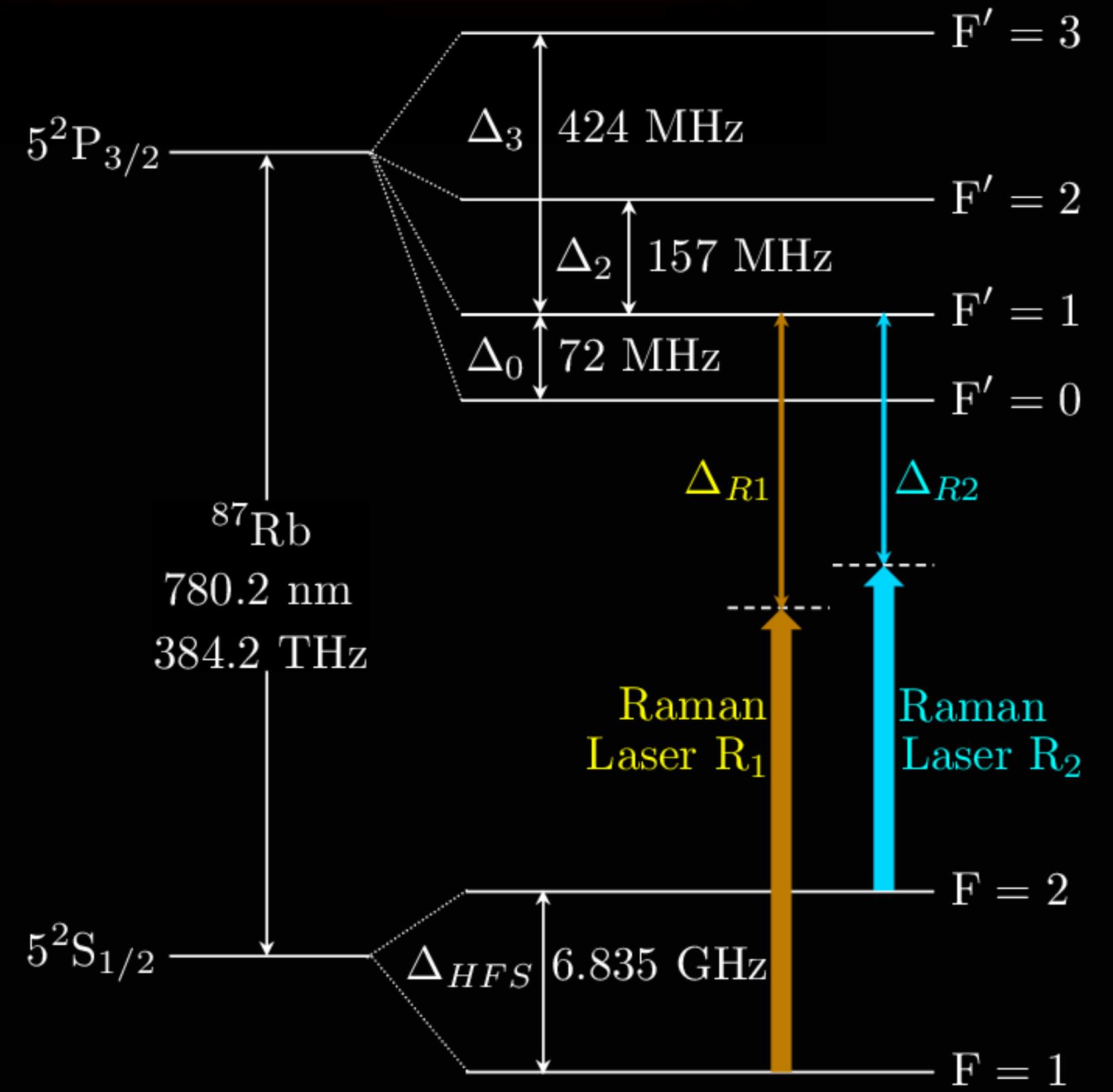


Sistema Laser Raman

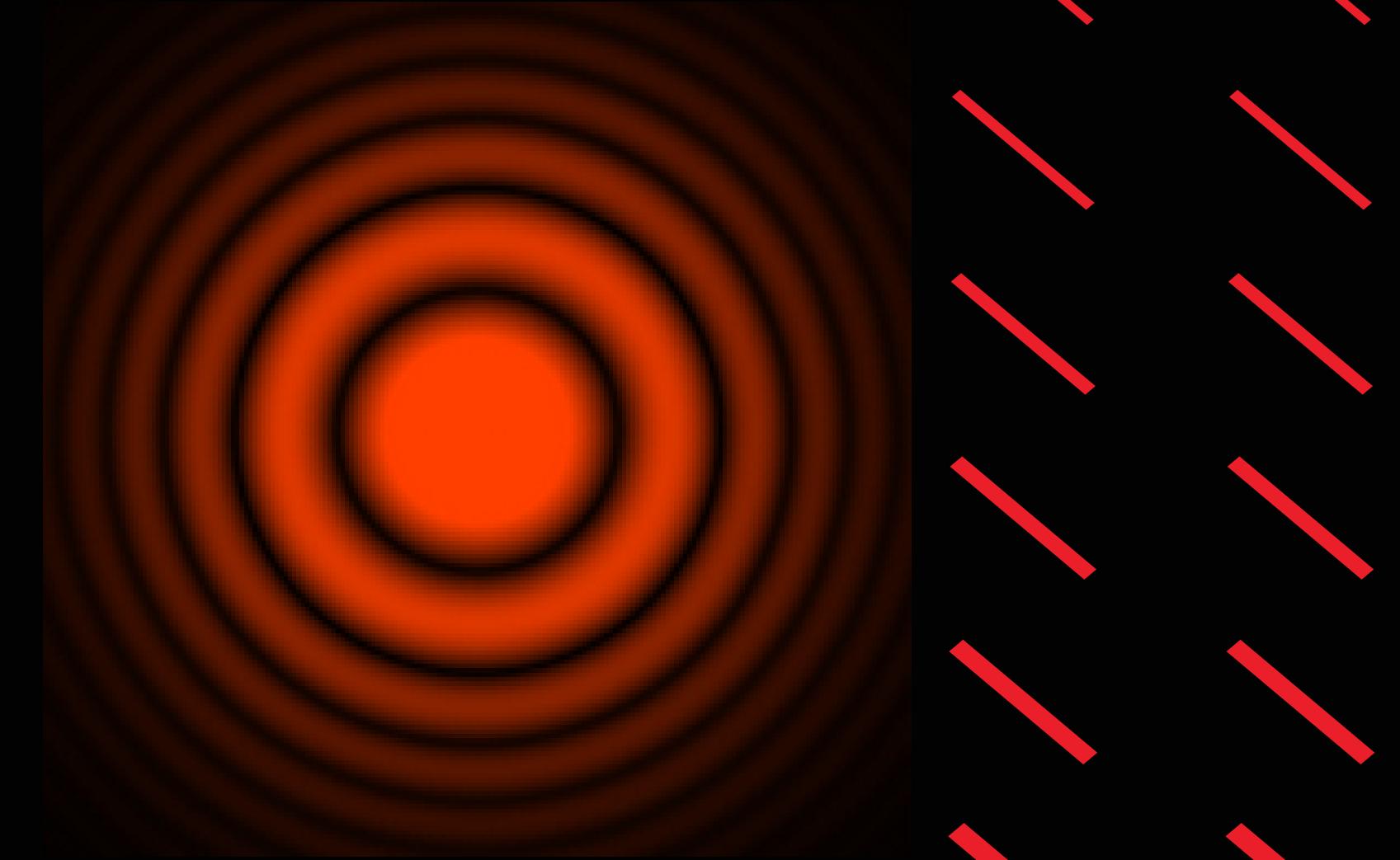
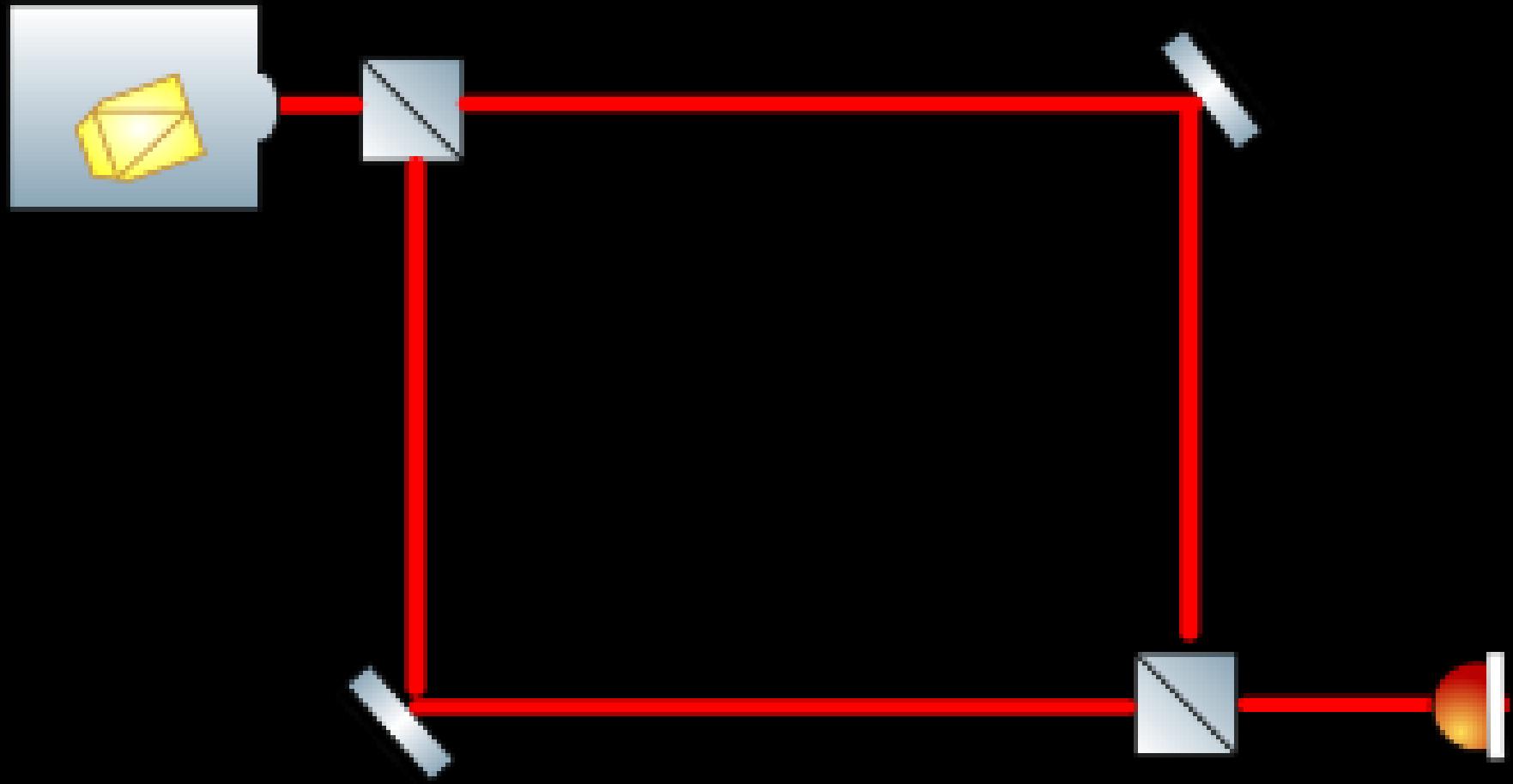
Amplificacando e travando os feixes de laser Raman para
interferometria de átomos em gravímetros



1-Lasers Raman

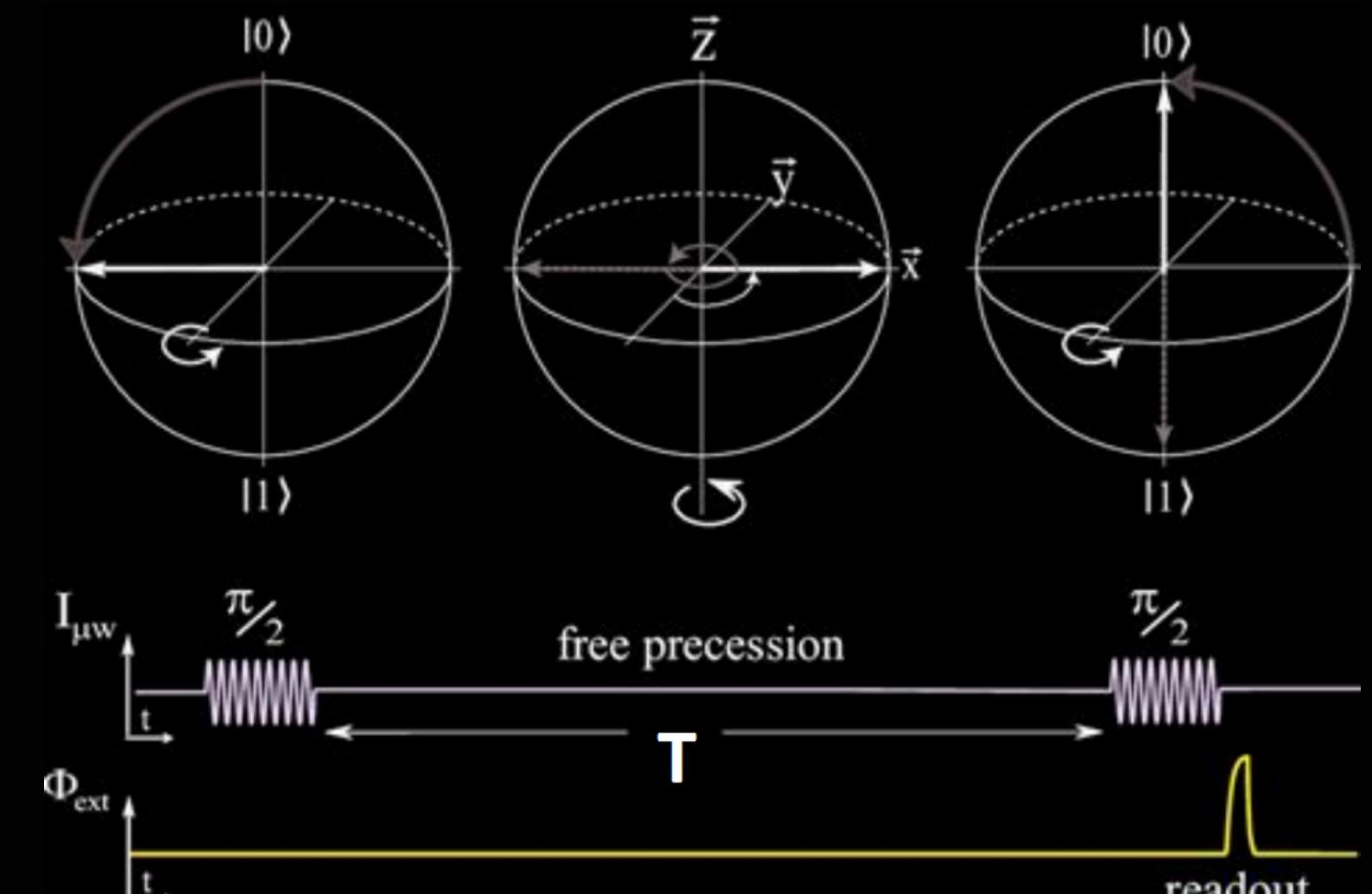


2-Interferometría Mach Zehnder

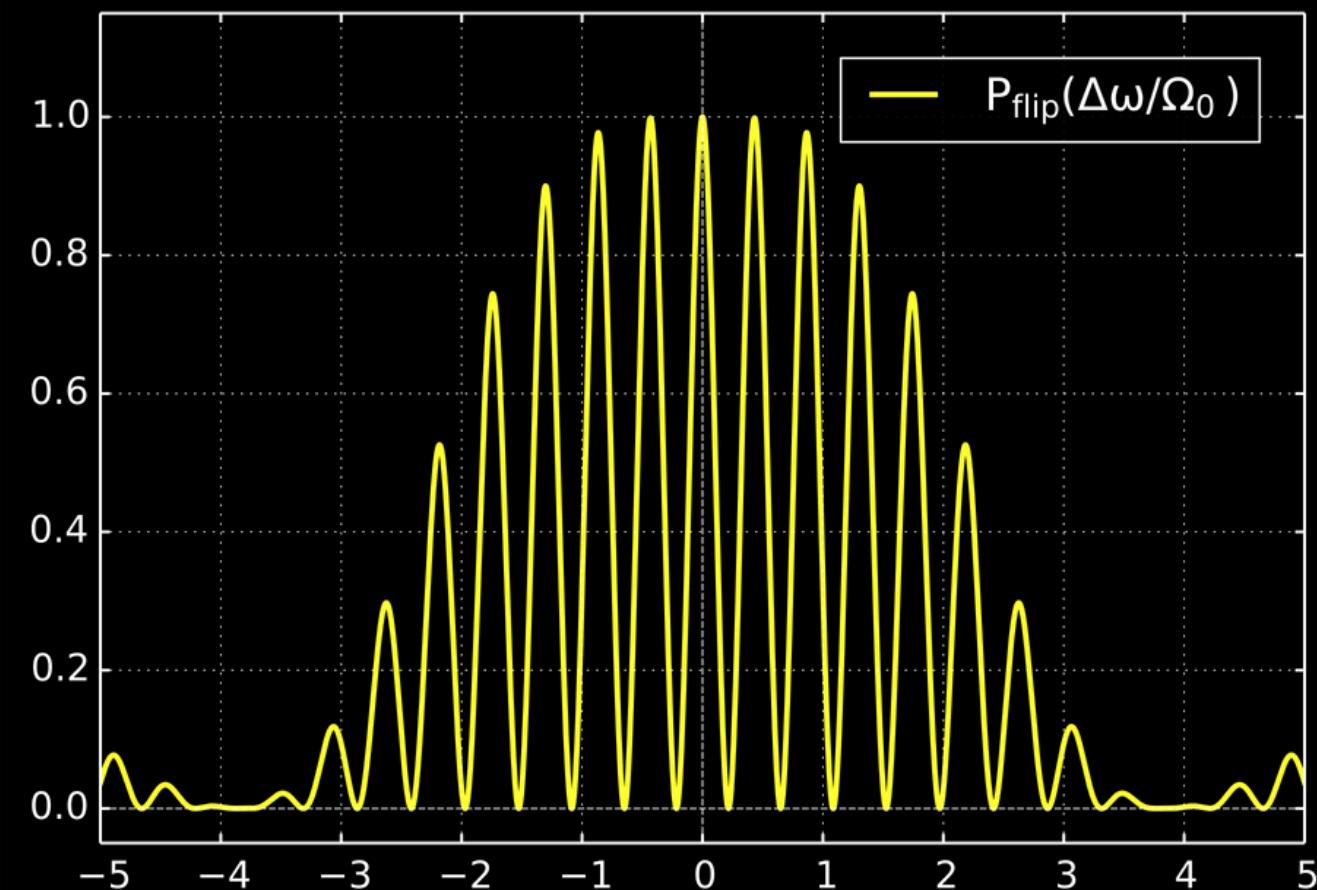


$$I(\Delta\varphi) = I_{\max} \cos^2(\Delta\varphi/2)$$

3-Interferometria Ramsey



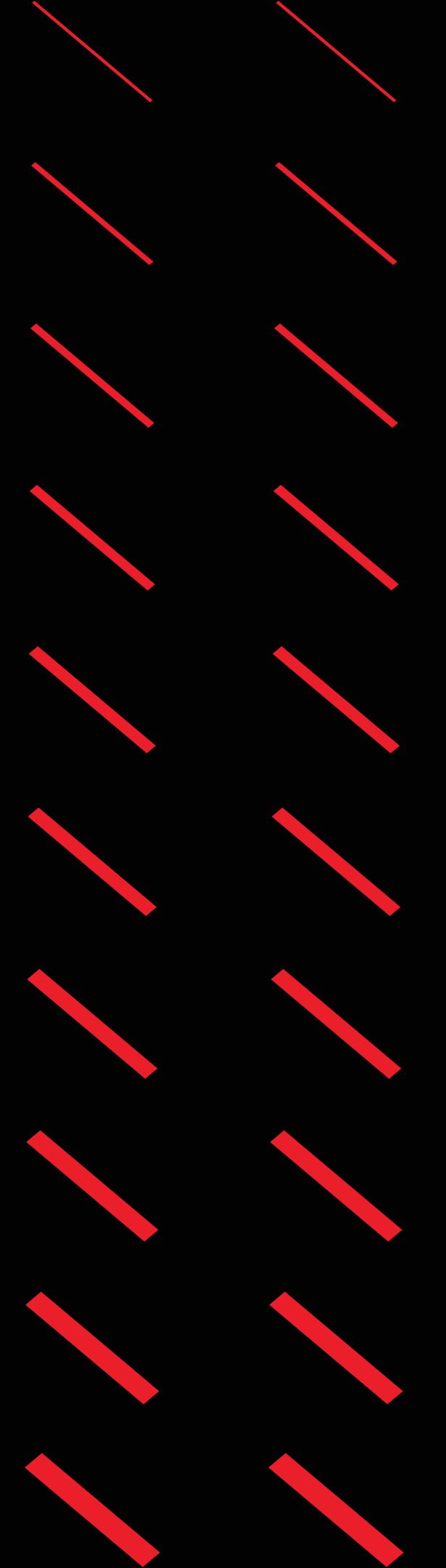
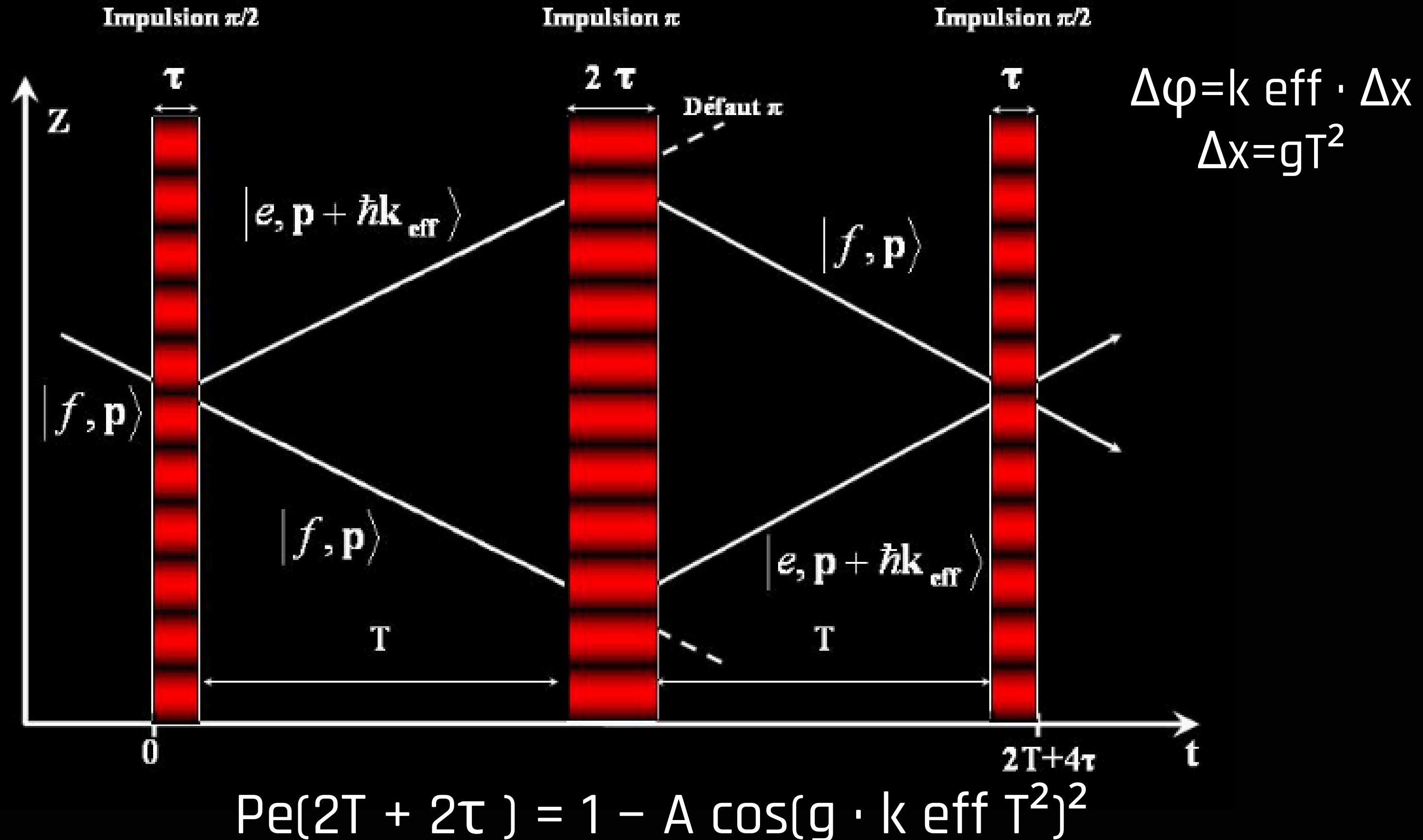
T é o tempo de interrogação



$\Delta=\omega-\omega_0$ é o detuning

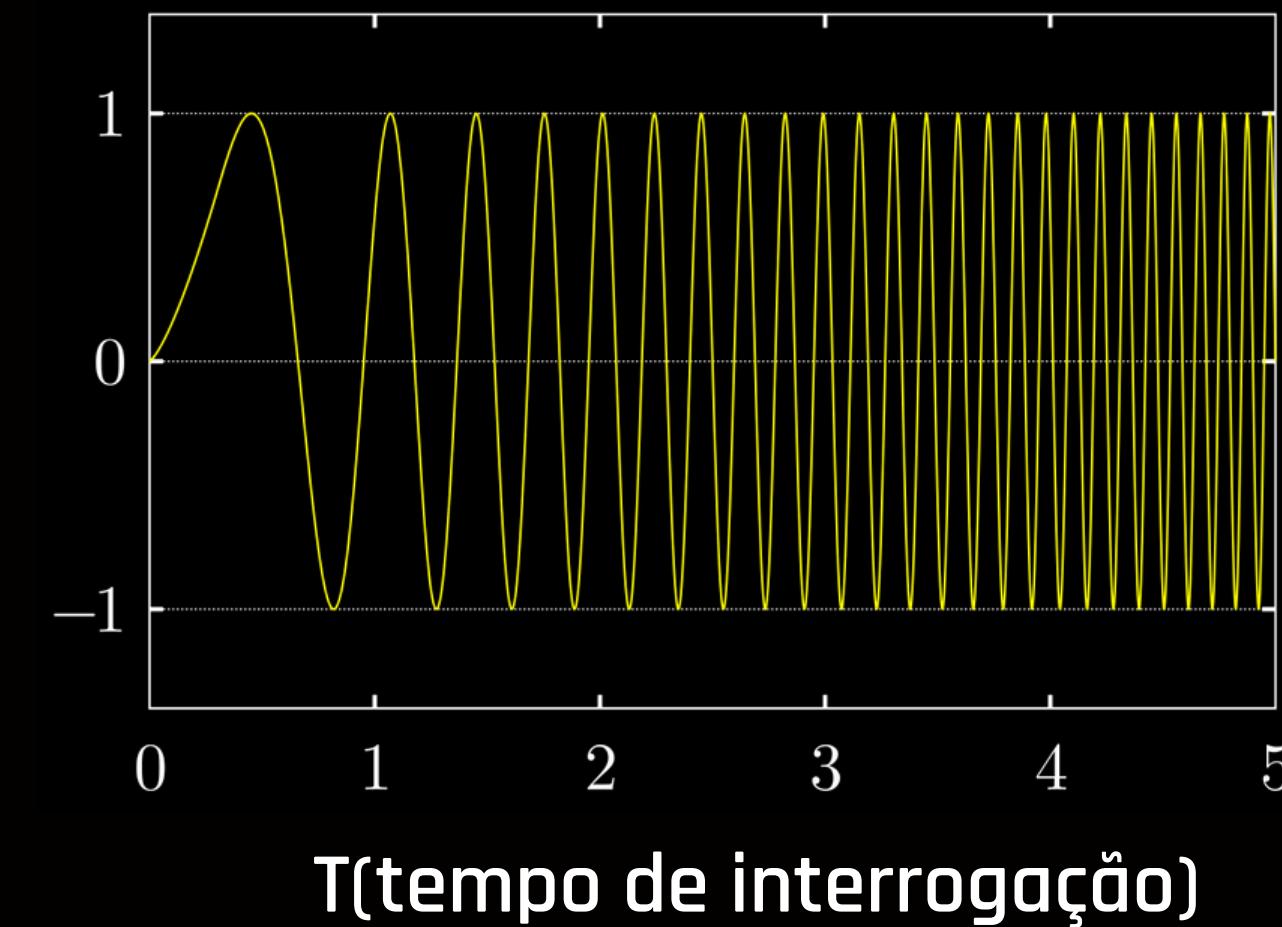
$$P_1(T, \Delta) = \cos^2(\Delta * T / 2)$$

\hbar -Interferometría atómica para gravimetría



5-Obtendo um valor para g

Chirp



$$Pe(2T + 2\tau) = 1 - A \cos(g \cdot k_{\text{eff}} T^2 + (2\pi a \cdot T) \cdot T)^2$$

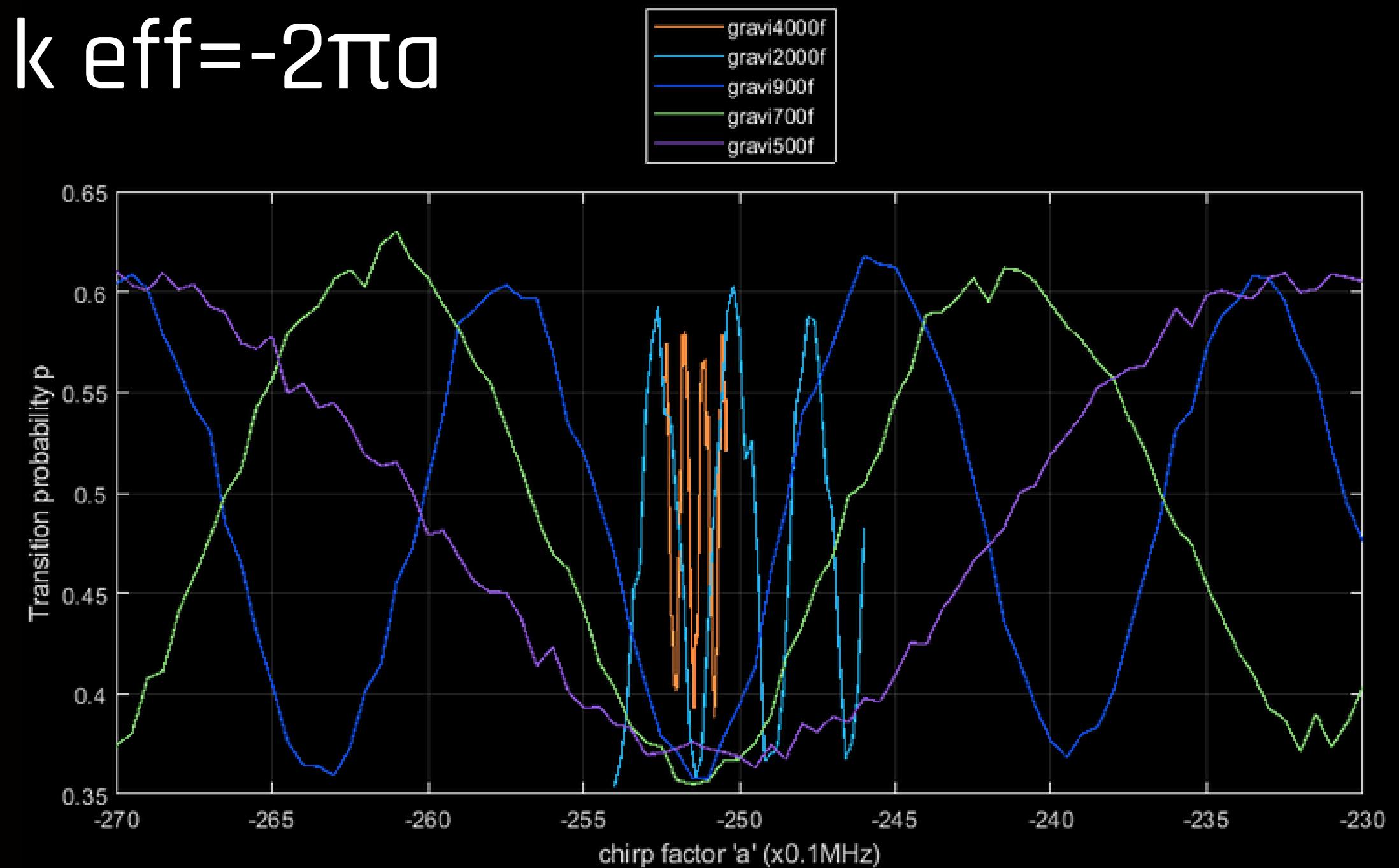
a é a taxa de chirp

ela é equivalente a mudar o detuning

Δ com o tempo numa rampa no
interferômetro de Ramsey.

6-Resultados Gravimetría

$$g \cdot k_{eff} = -2\pi a$$



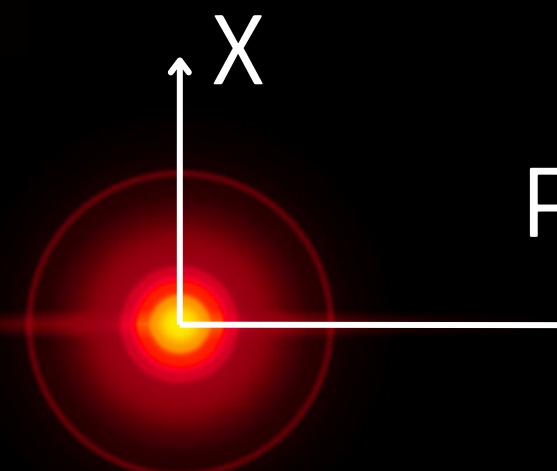
$$g = -2\pi a / k_{eff} = -2\pi \frac{-25.145 \frac{MHz}{s}}{2 \frac{2\pi}{780nm}} = 9.80655 \frac{m}{s^2}$$

7-Squeezing

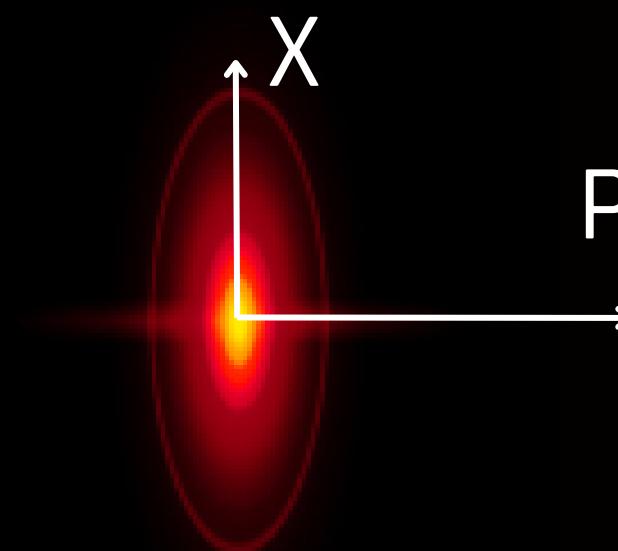
Uncertainty Principle

$$\Delta X \Delta P \geq \hbar/2$$

Coherent state

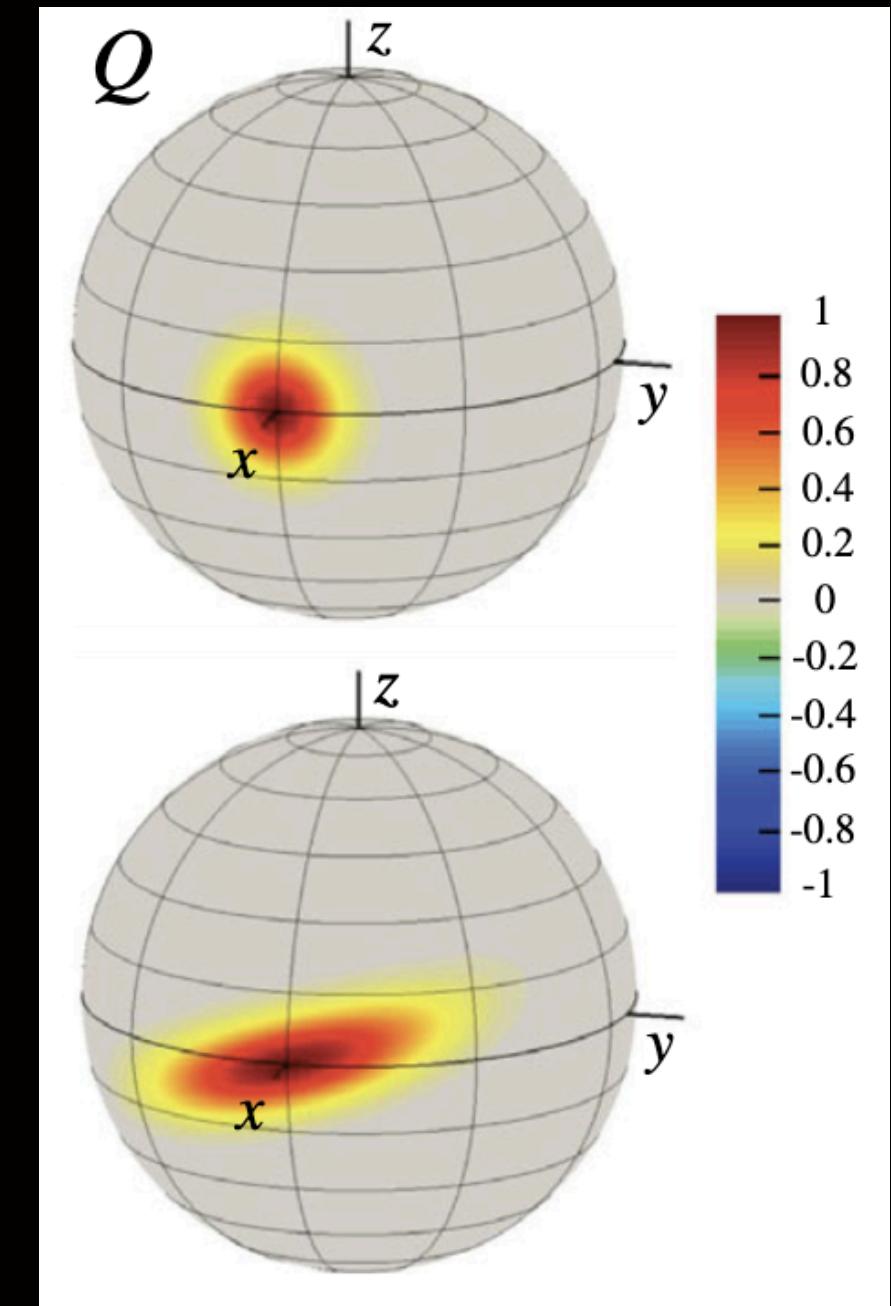


Squeezed state

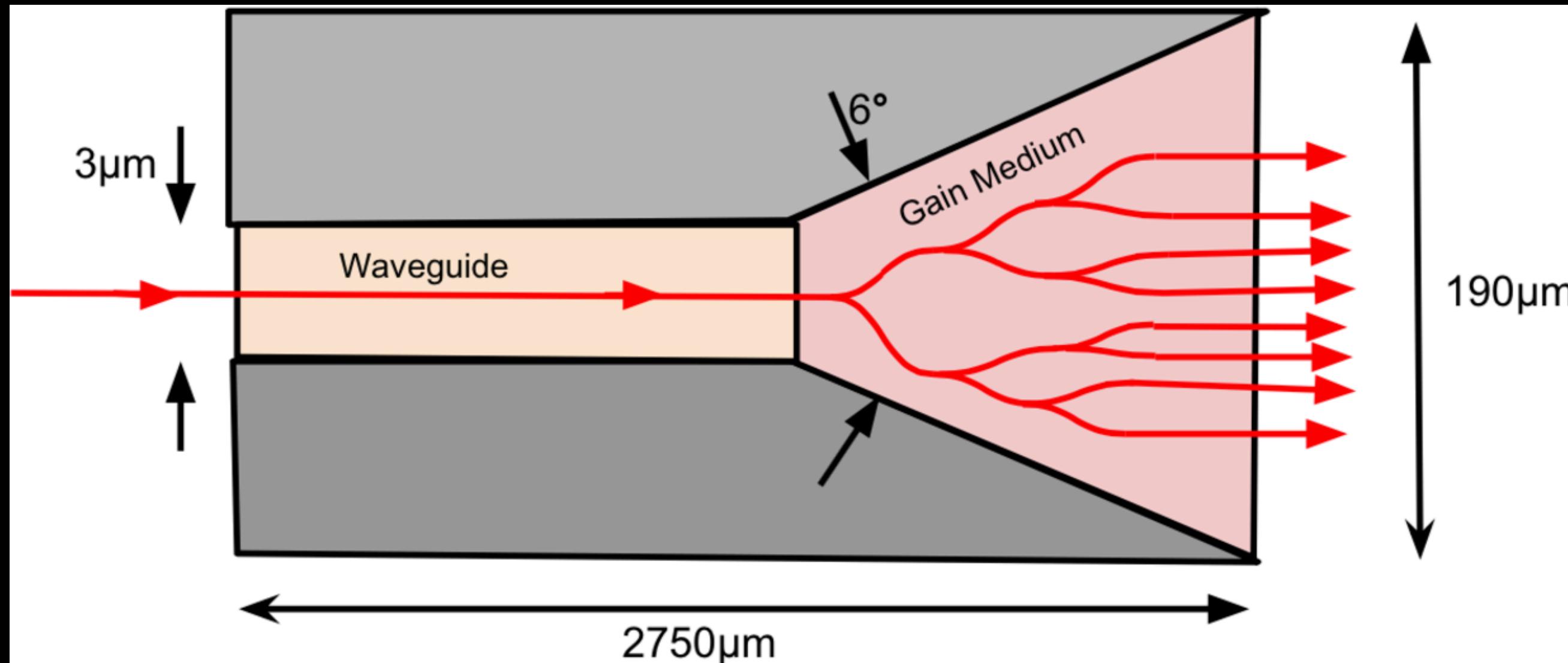


$$\Delta X = \Delta P = \sqrt{(\hbar/2)}$$

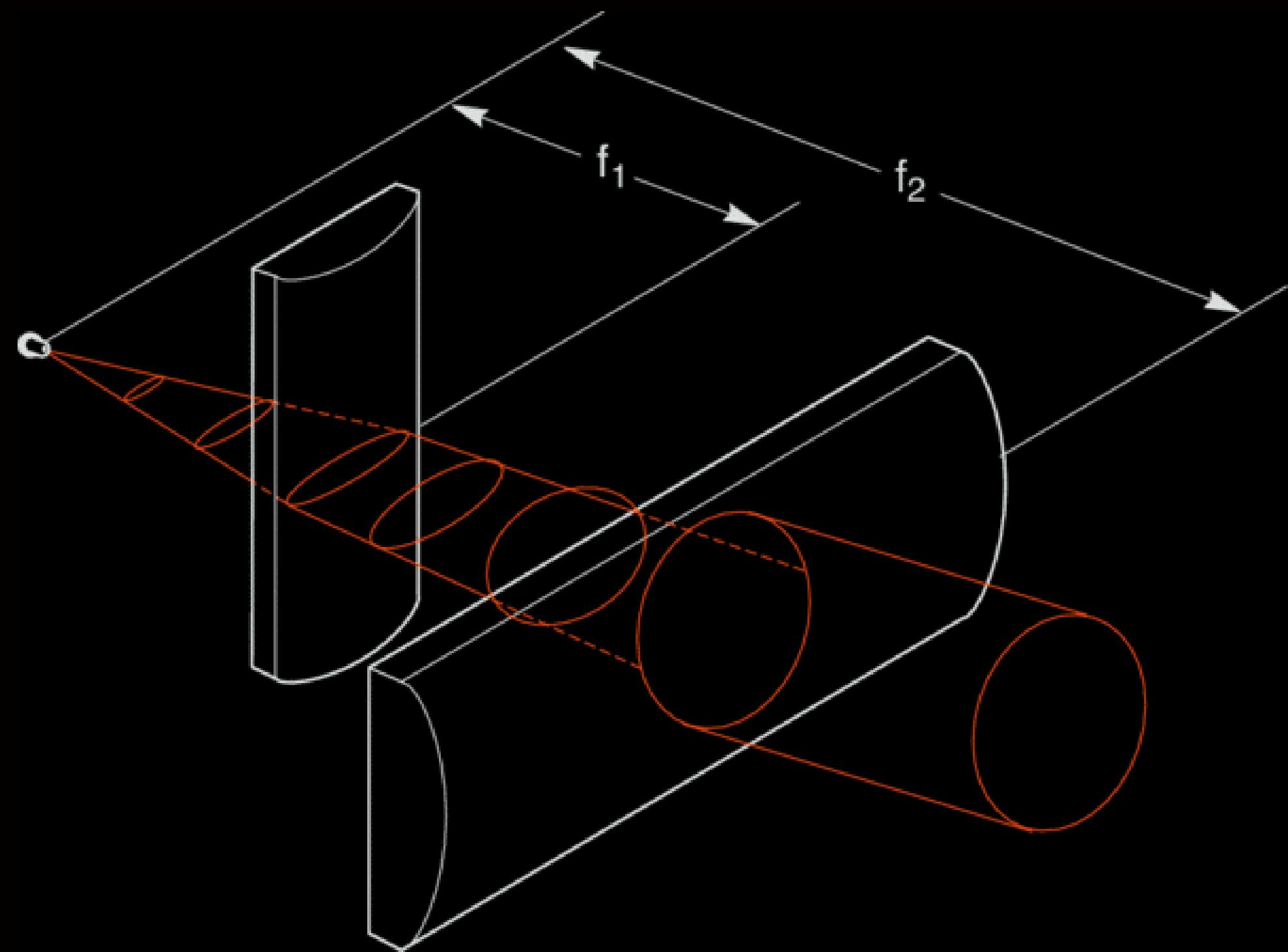
$$\Delta X > \Delta P$$



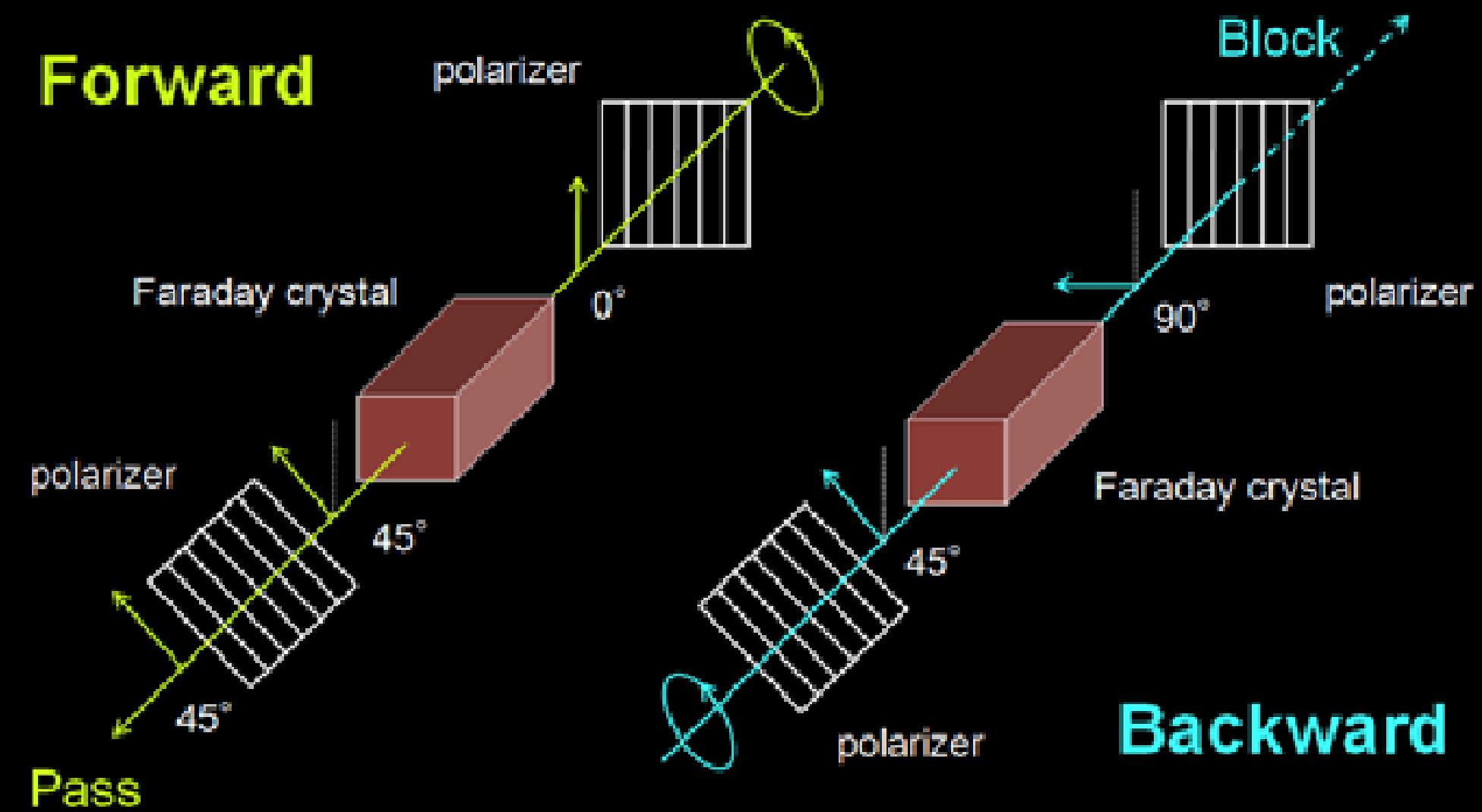
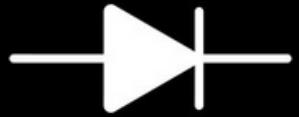
8-0 Tapered amplifier [amplificador em cone]



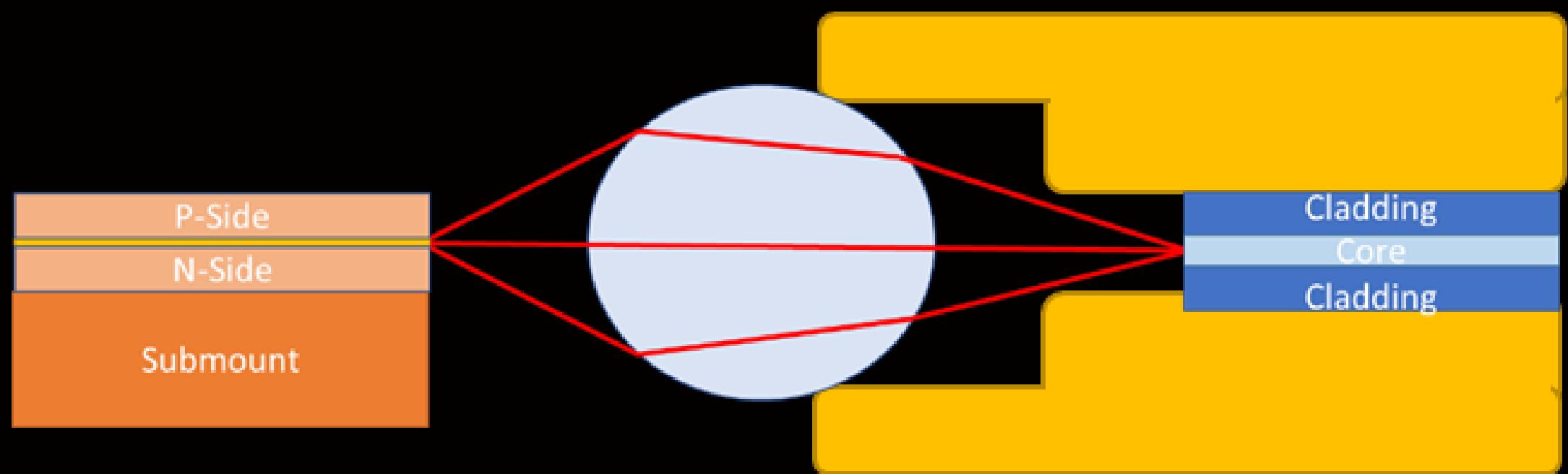
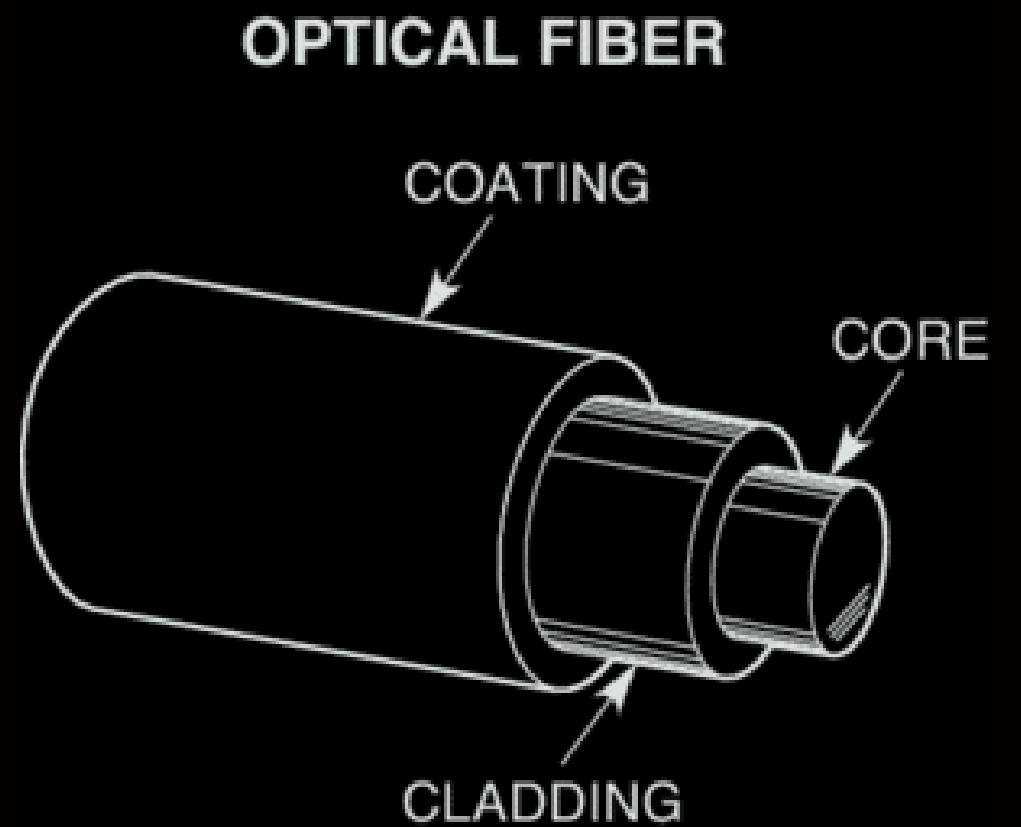
9-Saída astigmática do TA



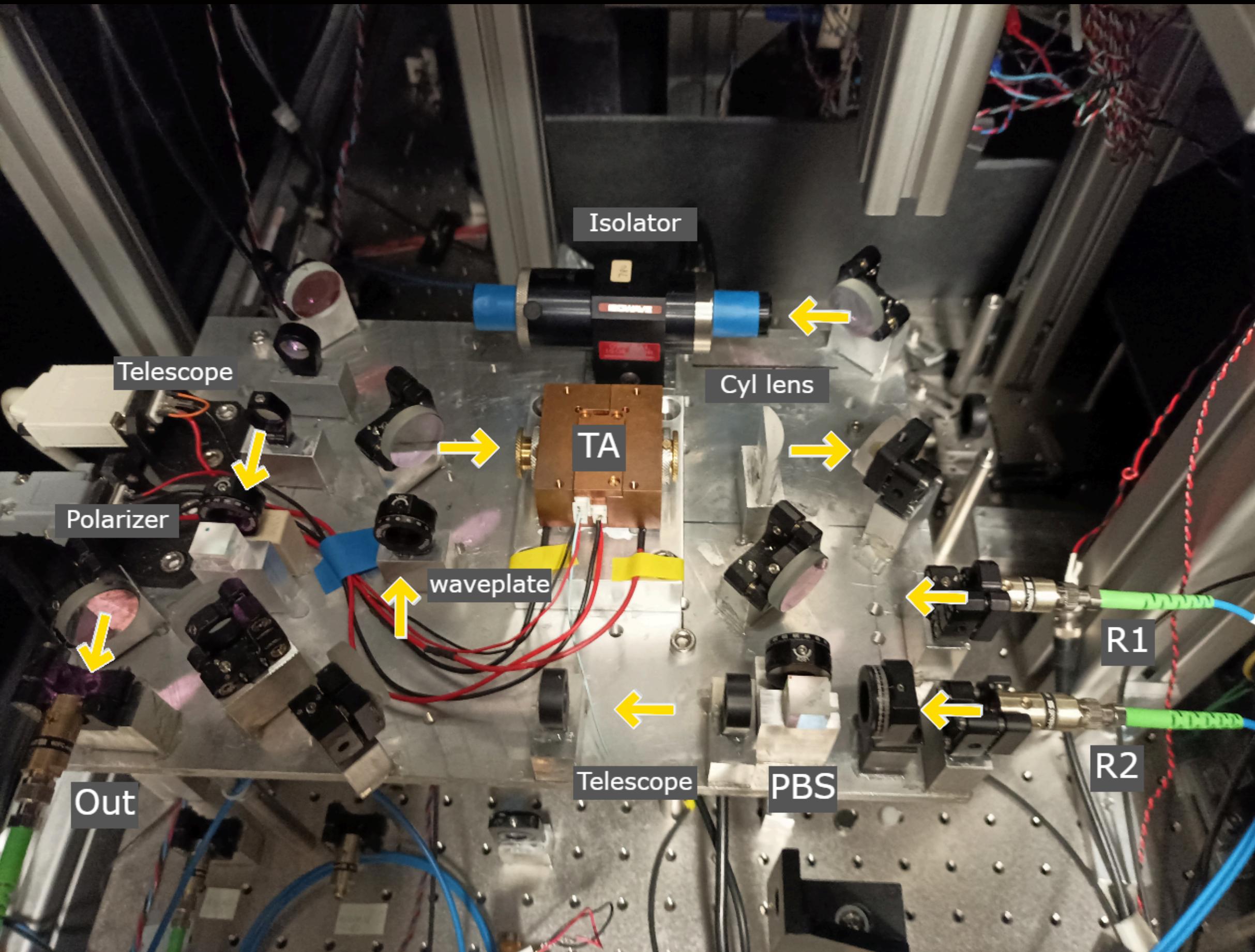
10-0 Isolador ótico



11-Acoplamiento Fibra óptica

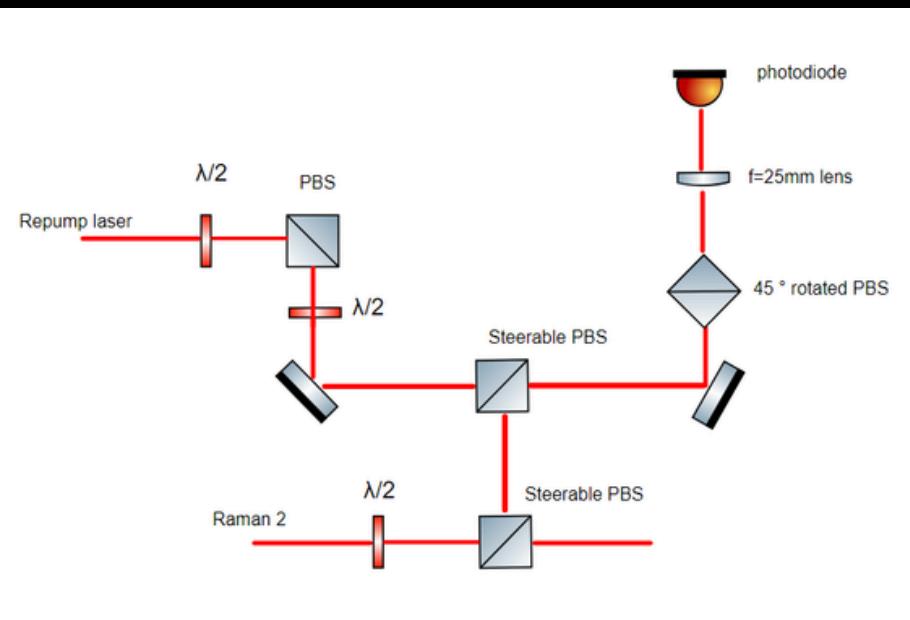


12-A montagem do TA

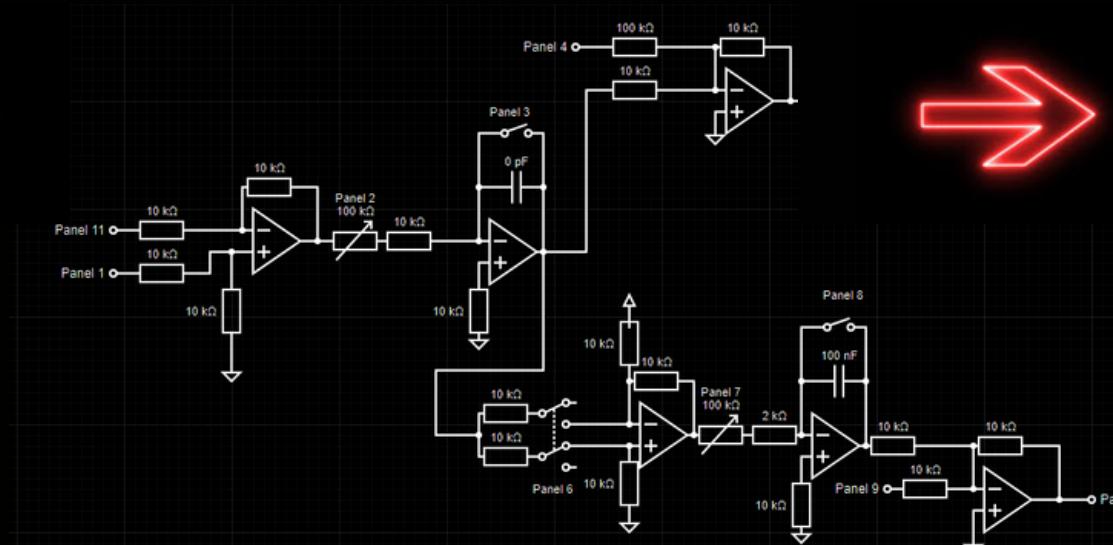


13-A trava offset

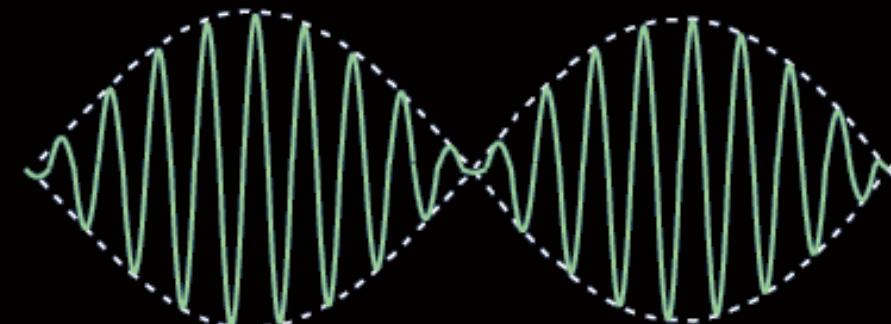
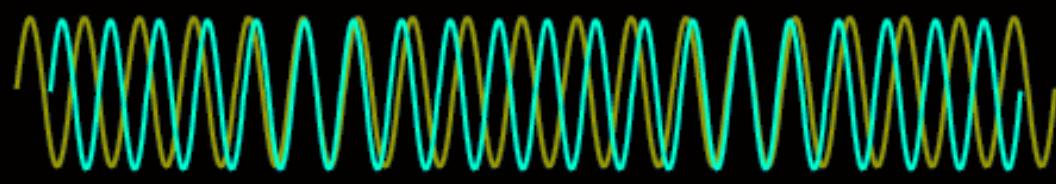
Integrador
+ integrad
or duplo



F to U



R2 laser
corrente e
piezo

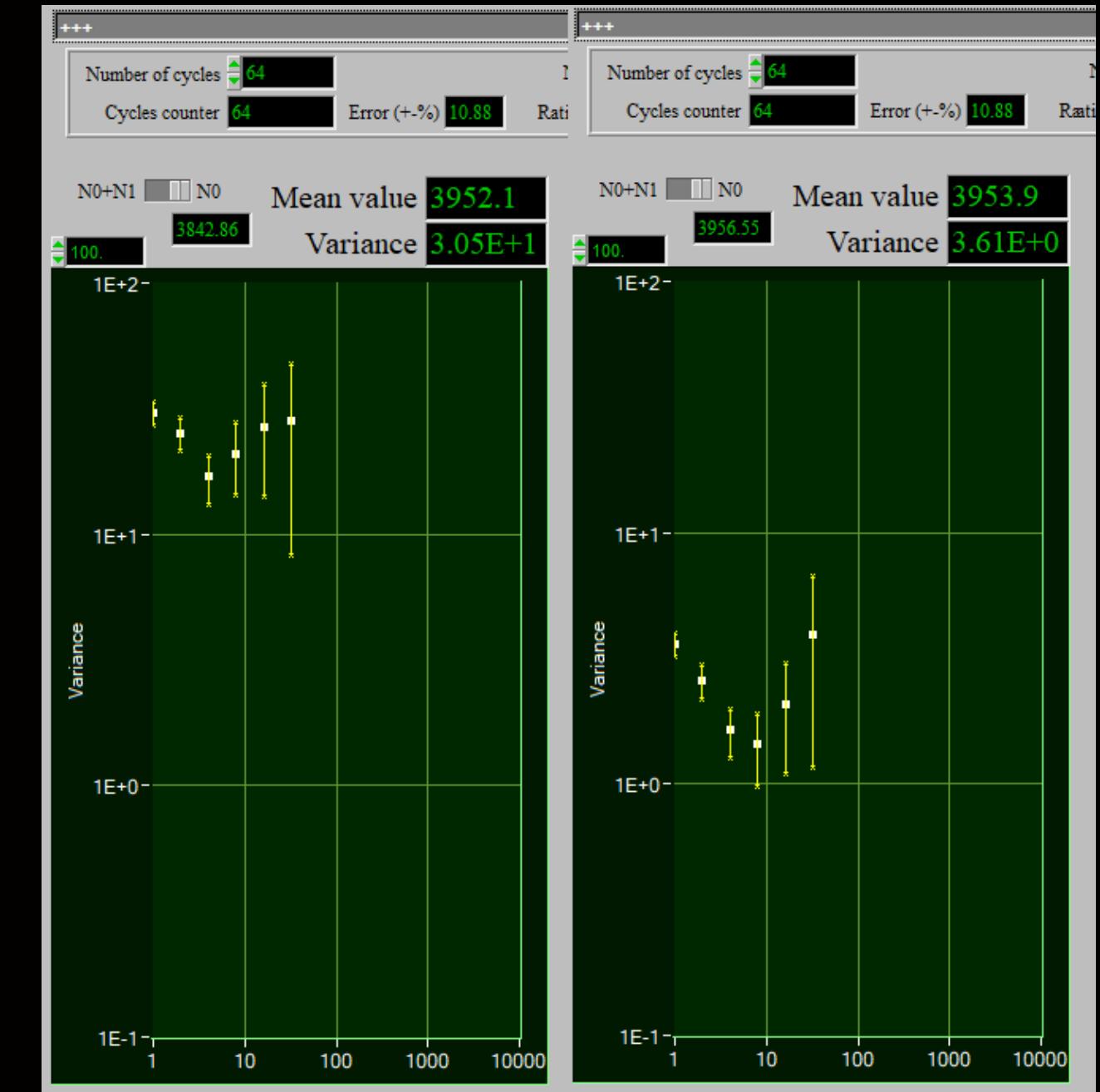
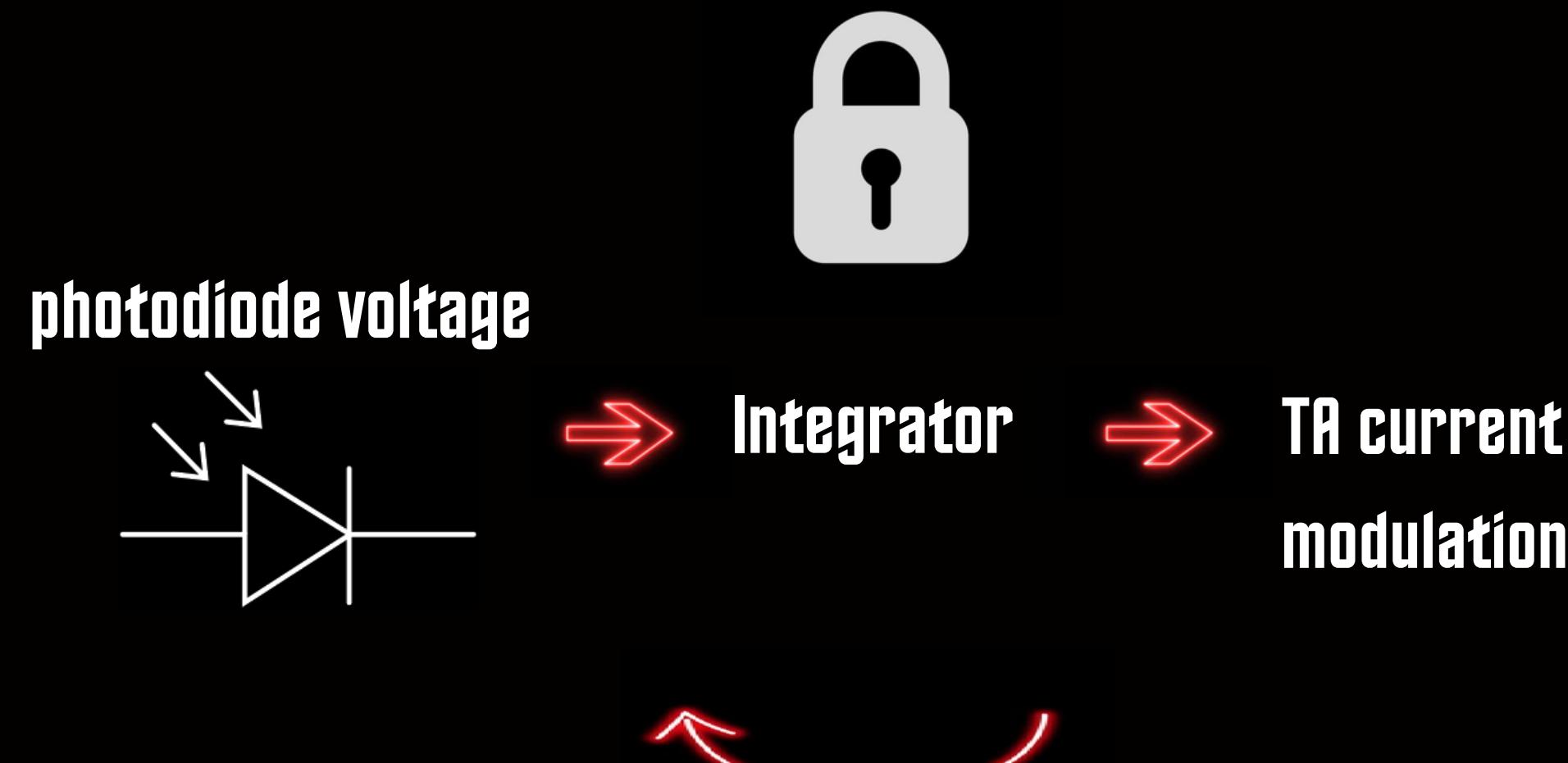


Repump laser



Raman 2

14-Trava de potência Raman



Muito obrigado pela atenção!