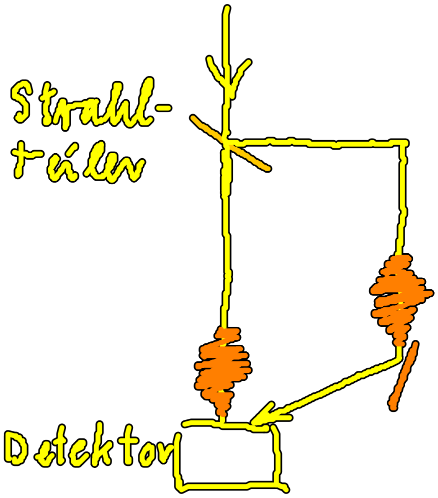
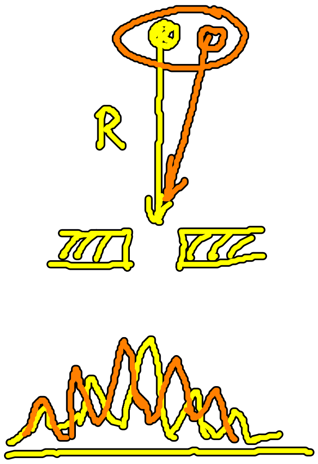
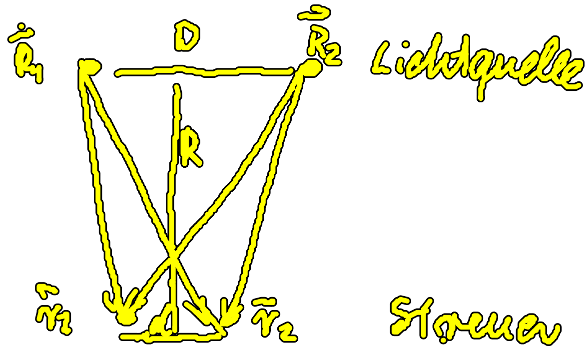
7.4 Kohärente Zustände

Zeitliche Kohärenz



räumliche Kohärenz





$$\Delta_1 = |R_1 - \vec{r}_1| - |R_1 - \vec{r}_2|$$

$$\Delta_2 = |R_2 - \vec{r}_1| - |R_2 - \vec{r}_2|$$

Bedingung für räuml. Kohärenz

$$|\Delta_1 - \Delta_2| < \lambda$$

$$\Rightarrow \frac{Dd}{R} < \lambda \quad ; \quad \frac{D}{R} = \alpha$$

$$\boxed{d < \frac{\lambda}{\alpha}}$$

$$|\alpha\rangle \quad ; \quad c|\alpha\rangle = \alpha|\alpha\rangle \quad \text{mit } \alpha \in \mathbb{C}$$

$$\text{mit } \langle\alpha|\alpha\rangle \quad , \quad |\alpha\rangle = \sum_{n=0}^{\infty} |n\rangle\langle n|\alpha\rangle$$

$$\Rightarrow \langle\alpha|c|\alpha\rangle = \alpha \quad \Rightarrow \langle\alpha|c^+|\alpha\rangle = \langle c\alpha|\alpha\rangle = \alpha^*\langle\alpha|\alpha\rangle = \alpha^*$$

$$\vec{E} = \frac{i}{\sqrt{2}}\sqrt{\frac{\hbar\omega}{\varepsilon V}}\,\vec{u}\left[\exp\{i(\vec{q}\cdot\vec{r} - \omega t)\}\,c - \exp\{-i(\vec{q}\cdot\vec{r} - \omega t)\}\,c^+\right]$$

$$\langle\alpha|c|\alpha\rangle = \alpha \qquad \langle\alpha|c^+|\alpha\rangle = \alpha^*$$

$$\langle\alpha|\hat{\vec{E}}|\alpha\rangle = \qquad \alpha = |\alpha|\exp\{i\varphi\}$$

$$\langle\alpha|\hat{\vec{E}}|\alpha\rangle = \frac{i}{\sqrt{2}}\sqrt{\frac{\hbar\omega}{\varepsilon V}}\,\vec{u}\,|\alpha|\left[\exp\{i(\vec{q}\cdot\vec{r} - \omega t + \varphi)\} - \exp\{-i(\vec{q}\cdot\vec{r} - \omega t + \varphi)\}\right]$$

$$= -\sqrt{2}\sqrt{\frac{\hbar\omega}{\varepsilon V}}\,\vec{u}\,|\alpha|\,\sin\{\vec{q}\cdot\vec{r}-\omega t+\varphi\}$$

$$\sin x = \frac{e^{x}-e^{-x}}{2i}$$