1 Quantum theory of coherent states

$$\vec{E}(\vec{r},t) = i\sum_k \vec{\epsilon_k}\sqrt{\frac{\hbar\omega_k}{2\epsilon_0 V}}(\hat{a}_k e^{-i\omega_k t + i\vec{k}\cdot\vec{r}} + \hat{a}_k^\dagger e^{-i\vec{k}\cdot\vec{r}+i\omega_k t})$$

$\hat{E^+}$=i$\sqrt{\frac{\hbar\omega}{2\epsilon_0 V}}(\hat{a}e^{-i\omega t + i\vec{k}\cdot\vec{r}})$