3.3 Dispersionsrelationen

$$P\int_{-\infty}^{+\infty}\frac{f(\omega')\,d\omega'}{\omega'-\omega} =$$

$$= \lim_{\varepsilon\searrow 0}\left[\int_{-\infty}^{\omega-\varepsilon}\frac{f(\omega')\,d\omega'}{\omega'-\omega} + \int_{\omega+\varepsilon}^{\infty}\frac{f(\omega')\,d\omega'}{\omega'-\omega}\right]$$

$$\int_{-\infty}^{+\infty}\frac{\omega' f(\omega')\,d\omega'}{\omega'^2-\omega^2} = \underbrace{\int_{-\infty}^{0}\frac{\omega' f(\omega')\,d\omega'}{\omega'^2-\omega^2}}_{\omega'\to-\omega'} + \int_{0}^{\infty}\frac{\omega' f(\omega')\,d\omega'}{\omega'^2-\omega^2}$$

$$\hookrightarrow = \int_{\infty}^{0}\frac{\omega' f^*(\omega')\,d\omega'}{\omega'^2-\omega^2} = -\int_{0}^{\infty}\frac{\omega' f^*(\omega)\,d\omega'}{\omega'^2-\omega^2}$$

Kap 3 Nichtlineare Optik

$$\vec{D}(\vec{r},t) = \varepsilon_0\vec{E}(\vec{r},t) + \varepsilon_0\int_0^\infty \underline{\chi}(t')\cdot\vec{E}(\vec{r},t-t')\,dt' + P^{NL}(\vec{r})$$

$$= \varepsilon_0\int_0^\infty \delta(t-t')\,\mathbb{1}\cdot\vec{E}(\vec{r},t')\,dt' + \varepsilon_0\int_0^\infty\cdots + P^{NL}$$

$$\delta(t-t')\,\mathbb{1} + \chi(t') = \underline{\varepsilon}(t')$$

$$\vec{D}(\vec{r},t) = \varepsilon_0 \int_0^\infty \underline{\varepsilon}(t') \cdot \vec{E}(\vec{r},t')\, dt' + P^{NL}(\vec{r},t)$$