

# Optikk del 6 : sensorprinsipper

## Polarisasjon

$\vec{P}$  : dipolmoment/volum  
 $\vec{P} = f(\vec{E}, \vec{\sigma}, \vec{B}, \dots)$

dipol:  $\bullet \uparrow \vec{E}, \rightarrow \vec{B}, \downarrow \vec{\sigma}$   
mekanisk spanning

$$\vec{D} = \epsilon_0 \vec{E} + \vec{P} = g(\vec{E}, \vec{\sigma}, \vec{B}, \dots)$$

$$D_i = g(E_j, \sigma_{kf}, B_h, \dots) \rightarrow \text{Rekventvikling}$$

$$\begin{aligned} \rightarrow D_i = & \underbrace{D_i^0}_{\text{I}} + \underbrace{\epsilon_{ih} E_h}_{\text{II}} + \underbrace{\epsilon'_{ihk} E_h E_k + \epsilon''_{ihkm} E_h E_k E_m + \dots}_{\text{III}} \\ & + \underbrace{\gamma_{ihk} \sigma_{kf}}_{\text{IV}} + \underbrace{\gamma'_{ihkm} \sigma_{kf} E_m}_{\text{V}} + \underbrace{\gamma''_{ihknt} \sigma_{kf} \sigma_{mf}}_{\text{VI}} + \dots \\ & + \underbrace{\Theta_{ihk} B_h E_k}_{\text{VII}} + \underbrace{\Theta'_{ikl} B_k B_l E_m}_{\text{VII}} \end{aligned}$$

I: Pyroelektrisk effekt

II: lineær dielektrisk effekt

III: Ikke-linear dielektrisk effekt

IV: piezoelektrisk effekt

V: elastooptisk effekt

VI: lineær magneto-optiske effekt (Faraday)

VII: Ikke-linear magneto-optiske effekt