

Piezoelectric constant matrix

$$\begin{bmatrix} 0 & 0 & 0 & 0 & d_{15} & 0 \\ 0 & 0 & 0 & d_{24} & 0 & 0 \\ d_{31} & d_{31} & d_{33} & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 207 & 0 \\ 0 & 0 & 0 & 207 & 0 & 0 \\ -53 & -53 & 135 & 0 & 0 & 0 \end{bmatrix} \quad 10^{12} \text{C/N}$$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & g_{15} & 0 \\ 0 & 0 & 0 & g_{24} & 0 & 0 \\ g_{31} & g_{31} & g_{33} & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 18.3 & 0 \\ 0 & 0 & 0 & 18.3 & 0 & 0 \\ -5.4 & -5.4 & 13.8 & 0 & 0 & 0 \end{bmatrix} \quad 10^{-3} \text{Vm/N}$$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & e_{15} & 0 \\ 0 & 0 & 0 & e_{24} & 0 & 0 \\ e_{31} & e_{31} & e_{33} & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 12.3 & 0 \\ 0 & 0 & 0 & 12.3 & 0 & 0 \\ -3.5 & -3.5 & 12.4 & 0 & 0 & 0 \end{bmatrix} \quad \text{C/m}^2$$

$$\begin{bmatrix} 0 & 0 & 0 & 0 & h_{15} & 0 \\ 0 & 0 & 0 & h_{24} & 0 & 0 \\ h_{31} & h_{31} & h_{33} & 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 14.1 & 0 \\ 0 & 0 & 0 & 14.1 & 0 & 0 \\ -4.5 & -4.5 & 15.8 & 0 & 0 & 0 \end{bmatrix} \quad 10^8 \text{V/m}$$

Clamped dielectric constant Matrix

$$\begin{bmatrix} \epsilon_{11}^S/\epsilon_0 & 0 & 0 \\ 0 & \epsilon_{11}^S/\epsilon_0 & 0 \\ 0 & 0 & \epsilon_{33}^S/\epsilon_0 \end{bmatrix} = \begin{bmatrix} 990 & 0 & 0 \\ 0 & 990 & 0 \\ 0 & 0 & 880 \end{bmatrix}^S$$

Free dielectric constant matrix

$$\begin{bmatrix} \epsilon_{11}^T/\epsilon_0 & 0 & 0 \\ 0 & \epsilon_{11}^T/\epsilon_0 & 0 \\ 0 & 0 & \epsilon_{33}^T/\epsilon_0 \end{bmatrix} = \begin{bmatrix} 1280 & 0 & 0 \\ 0 & 1280 & 0 \\ 0 & 0 & 1100 \end{bmatrix}^T$$

