

$$W = \int \rho(\mathbf{x}) \Phi(\mathbf{x}) d^3x = \frac{\epsilon_0}{2} \int |\mathbf{E}|^2 d^3x \quad \text{Energy to bring charges from } \infty \text{ (4.83)}$$

$$W = \frac{1}{2} \int \mathbf{E} \cdot \mathbf{D} d^3x \quad \text{Energy stored in electric field (4.89)}$$

$$\Delta W = -\frac{1}{2} \int_{V_1} \mathbf{P} \cdot \mathbf{E}_0 d^3x \quad \text{Dielectric placed in } \mathbf{E}_0 \text{ (4.93)}$$

$$W = \frac{1}{2} \int \mathbf{J} \cdot \mathbf{A} d^3x = \frac{1}{2\mu_0} \int |\mathbf{B}|^2 d^3x \quad \text{Energy to ramp current from zero (4.83):(5.149)}$$

$$W = \frac{1}{2} \int \mathbf{H} \cdot \mathbf{B} d^3x \quad \text{Magnetic energy in fields (4.89):(5.148)}$$

$$\Delta W = \frac{1}{2} \int_{V_1} \mathbf{M} \cdot \mathbf{B}_0 d^3x \quad \text{Energy to place permeable object in } \mathbf{B}_0 \text{ (4.93):(5.150)}$$