

In matter, we have

$$\left\{ \begin{array}{l} \nabla \cdot \vec{D} = \rho_F \\ \nabla \cdot \vec{B} = 0 \\ \vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t} \\ \vec{\nabla} \times \vec{B} = \vec{J}_F + \frac{\partial \vec{D}}{\partial t} \end{array} \right. \quad \left\{ \begin{array}{l} \vec{D} = \epsilon_0 \vec{E} + \vec{P} \\ \vec{H} = \vec{B}/\mu_0 - \vec{M} \end{array} \right.$$

If there are no free charges or currents, can we argue

$$\nabla \cdot \vec{E} = 0 ?$$

- A) Yes, always
- B) Yes, under certain conditions (what are they?)
- C) No, in general this will NOT be true!
- D) ??