Maxwell's Equations

In terms of the **E** and **B** fields Maxwell's equations are

Maxwell's Equations

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$
$$\nabla \cdot \mathbf{B} = 0$$
$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$
$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t}.$$

In terms of the electromagnetic field strength tensor $F^{\mu\nu}$ Maxwell's equations can be encapsulated by the single equation

Maxwell's Equations

$$\partial_\mu F^{\mu\nu} = j^\nu$$

where $F^{\mu\nu} = \partial^\mu A^\nu - \partial^\nu A^\mu$ and $A^\mu = (\Phi, \mathbf{A})$ is the EM 4-potential, and $j^\nu = (\rho, \mathbf{J})$ is the EM 4-current.