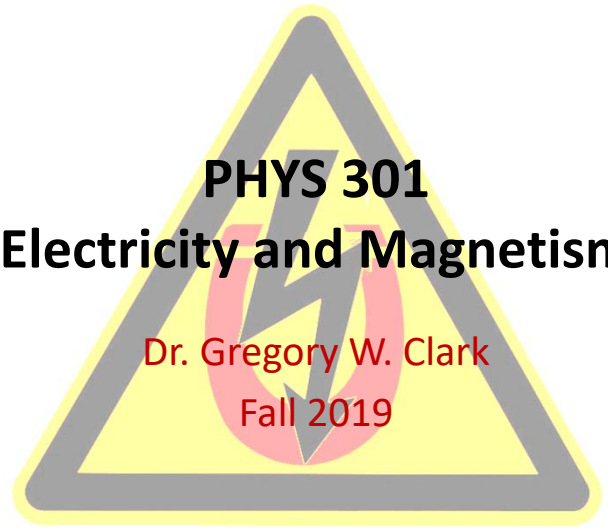
PHYS 301
Electricity and Magnetism



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Today!

- Electric fields
  - Coulomb's law
  - Gauss' law

ELECTROSTATICS

[Source charges at rest]

- **Basic problem**:
  Find forces on test charge due to source charges
- Superposition Principle holds for forces and vector fields

THE ELECTRIC FIELD:

For a single point charge: $\vec{E} = \frac{1}{4\pi\varepsilon_o}\frac{q}{r^2}\hat{r}$

For a differentially small point charge: $d\vec{E} = \frac{1}{4\pi\varepsilon_o}\frac{dq}{r^2}\hat{r}$

For continuous charge distribution: $\vec{E} = \int d\vec{E} = \frac{1}{4\pi\varepsilon_o}\int \frac{dq}{r^2}\hat{r}$

where $\varepsilon_o = 8.85\times10^{-12} C^2 / Nm^2$