

Physics 11b

Lecture #3

Electric Flux
Gauss's Law

What We Did Last Time

- Introduced **electric field \mathbf{E}** by $\mathbf{F}_Q = Q \cdot \mathbf{E}(\mathbf{r})$
- **Field lines** and the rules
 - From a positive charge to a negative charge
 - No splitting, merging, or crossing
 - Number of field lines \propto amount of charge
 - Density \propto E field
- Was about to define electric flux
 - We continue from there...

Today's Goals

- Define electric flux Φ_E
 - Start from the number of field lines
- Introduce **Gauss's Law**
 - Useful tool for many E&M problems
- Apply Gauss's Law to a few examples
 - Spherical charge distribution
 - Infinite sheet of charge
- Discuss basic rules of **conductors**
 - Derive them using Gauss's Law