

# Electric Flux “Counts Field Lines”

I had two quick questions that I thought might be good food for thought for other students as well: Why is it that the net flux equals zero when the charge is placed outside the object (obviously canceling the contributions of the field lines to the flux), but not equal to 0 when the charge is inside the object? Is it because all the field lines start inside the object and end outside the object rather than starting and ending outside the object? What are the units of Phi, and how is this "flux" actually measured in real life?

Can you give us a clear, simple definition of what flux is?

Flux through surface  $S$

$$\Phi_S = \int_S \vec{E} \cdot d\vec{A}$$

Integral of  $\vec{E} \cdot d\vec{A}$  on surface  $S$

Representing the area of a surface as a vector in order to take the dot product.

