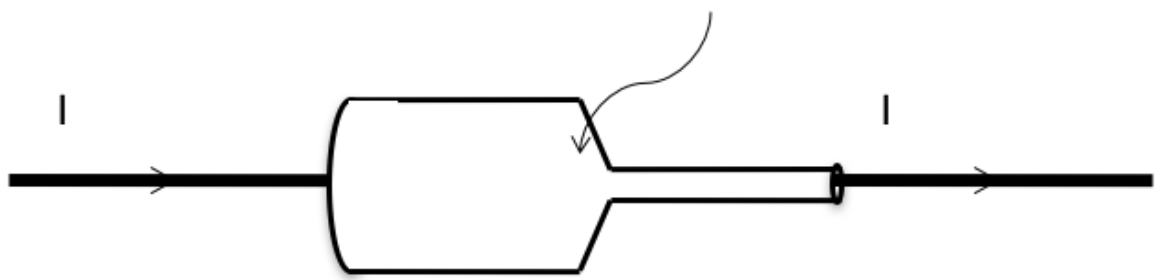
Recall the machined copper from last class, with steady current flowing left to right through it



In steady state, do you expect there will be any surface charge accumulated anywhere on the walls of the conductor?

A. Yes
B. No

$$\mathcal{E} = \oint \mathbf{E} \cdot d\mathbf{l}$$

EMF ($\mathcal{E}$) is the line integral of the total force per unit charge around a closed loop. The units of EMF are:

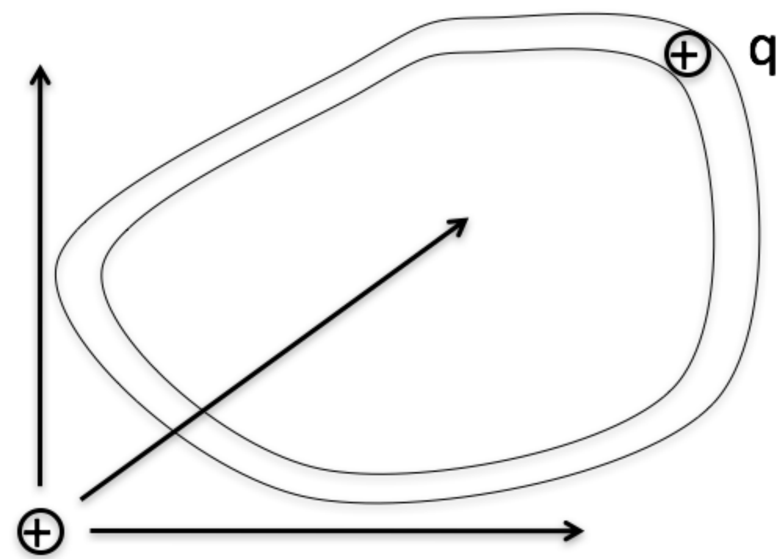
A. Farads
B. Joules
C. Amps, (that's why current flows.)
D. Newtons, (that's why it's called emf)
E. Something else

Imagine a charge q able to move around a tube which makes a closed loop. If we want to drive the charge around the loop, we **cannot** do this with E-field from a single stationary charge.

Can we drive the charge around the loop with some combination of stationary + and – charges?

A. Yes

B. No



Consider a pure electrostatic electric field $\mathbf{E}_{es}$; in this case, the curl of the field vanishes (as we have seen before).

$$\nabla \times \mathbf{E}_{es} = 0$$

What is the EMF associated with such a field over a closed loop?

$$\oint \mathbf{E}_{es} \cdot d\mathbf{l} = ??$$

A. Non-zero
B. Zero
C. Positive
D. Negative

A circuit with a battery with voltage difference ΔV is attached to a resistor. The force per charge due to the charges is $\mathbf{E}$. The force per charge inside the battery is $\mathbf{f} = \mathbf{f}_{bat} + \mathbf{E}$.

How many of the following statements are true?

$$\mathcal{E} = \oint \mathbf{f} \cdot d\mathbf{l} \qquad \mathcal{E} = \oint \mathbf{f}_{bat} \cdot d\mathbf{l}$$

$$\mathcal{E} = \int_B^A \mathbf{E} \cdot d\mathbf{l} \qquad \mathcal{E} = \int_A^B \mathbf{f}_{bat} \cdot d\mathbf{l}$$

A. 0 B. 1 C. 2 D. 3 E. 4