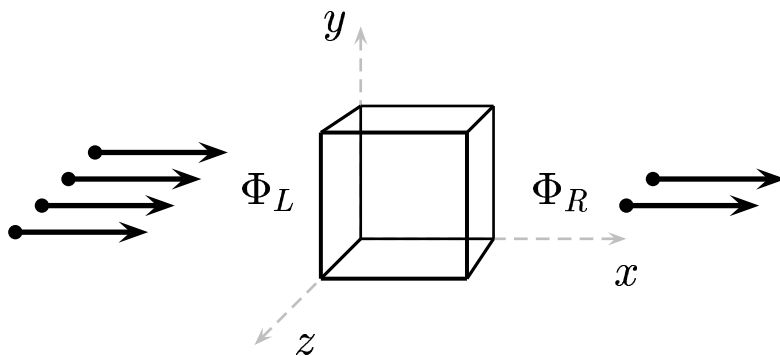


Consider the space of a cubic box.  
The Electric field is parallel to the  $x$ -axis.  
Flux entering from left:  $|\Phi_L| = 4 \text{ N m}^2/\text{C}$ .  
Flux leaving from right:  $|\Phi_R| = 2 \text{ N m}^2/\text{C}$ .



Find  $Q_{encl}$ , the net charge enclosed.

- A)  $Q_{encl} = 4 \epsilon_0$
- B)  $Q_{encl} = 2 \epsilon_0$
- C)  $Q_{encl} = -2 \epsilon_0$
- D)  $Q_{encl} = -4 \epsilon_0$
- E)  $Q_{encl} = 0$

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Gauss's Law states that  $\Phi_S = \frac{Q_{encl}}{\epsilon_0}$ .

Here  $\Phi_S$  is the flux leaving the cubic region.

$$\begin{aligned} \frac{Q_{encl}}{\epsilon_0} &= \Phi_S \\ &= -|\Phi_L| + |\Phi_R| \\ &= -4 + 2 \\ &= -2, \quad \text{so} \\ Q_{encl} &= -2 \epsilon_0. \end{aligned}$$

Answer **C**.