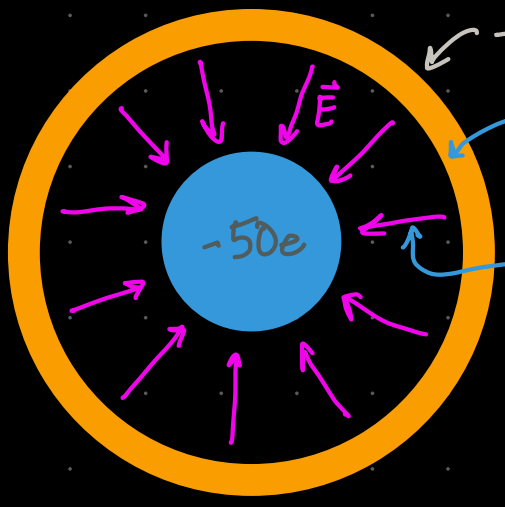
A ball with charge -50e lies at the center of a hollow spherical metal shell that has a net charge of -100e. What are the charges on the shell's inner surface and outer surface?



no $\vec{E}$ within metal, $\vec{E}=0$ always in a conducting material

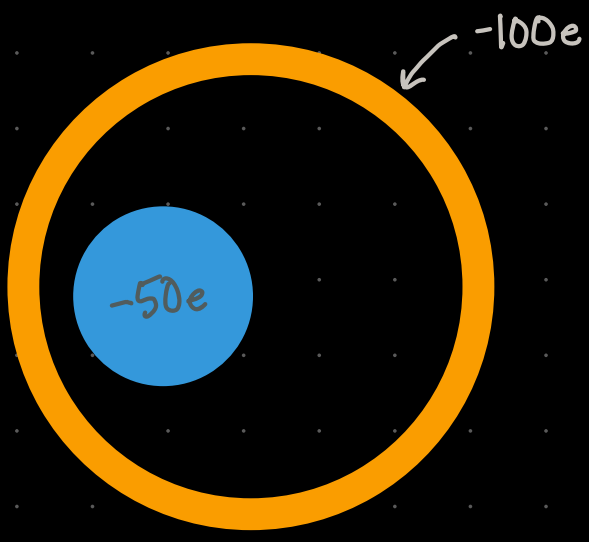
$\vec{E} \neq 0$ in the cavity

This $\vec{E}$ repels negative charges in the metal shell. The $-q$ will move to the outer surface of the shell and leave an equal amount of $+q$ on the inner surface

→ Result is $q=-50e$ is repelled from the inner surface to the outer surface of the shell. This leaves $q=+50e$ on the inner surface of the shell.

→ The -50e that moved to the shell's outer surface will combine with the -100e that was already there. There will be -150e of charge on the outer surface of the shell after the system reaches equilibrium.

A ball with charge -50e lies off-center inside a hollow spherical metal shell that has a net charge of -100e. What are the charges on the shell's inner surface and outer surface?



This is similar to the previous system. There is still no $\vec{E}$-field within the metal shell because $\vec{E} = 0$ in a conductor.
$\vec{E} \neq 0$ in the cavity and this $\vec{E}$ will repel $q = -50e$ to the outer surface of the shell and leave $q = +50e$ on the inner surface of the shell.

The +50e on the inner surface will not distribute evenly. There will be more +q on the surface near the -50e and less +q on the far side of the inner surface. But since the $\vec{E}$-field only exists within the cavity, the $\vec{E}$-field does not affect the charge on the outer surface of the shell. The charge on the outer surface (-150e) will distribute across the shell's outer surface evenly.