# Charged Conductor at Equilibrium (3)

- Consider a conductor with a cavity and excess charge $Q$.
- Gauss's law implies that there is no net charge on the surface of the cavity.
- The external field is $\vec{E}_0(\vec{r})$. There is no field in the cavity.
- Now place a point charge $q$ inside the cavity.
- Gauss's law implies that there is a charge $-q$ on the surface of the cavity.
- Charge conservation implies that there is a charge $Q + q$ on the outer surface of the conductor.
- The external field changes to $\vec{E}(\vec{r})$. There is a nonzero electric field field inside the cavity.