Jackson

1.1(a) We prove the claim by showing the charge distribution can not be in equilibrium if some charge is in the interior of the conductor.

Suppose in some finite volume in the interior of the conductor, there is a total of nonzero charge. Then we can divide the volume into two sections that contain an equal amount of nonzero charge. These two sections exert equal and opposite force on each other via coulomb's law. Since they can move freely inside the conductor, they are each subject to a change in their momentum, thus the charge distribution is not in equilibrium.

Davidson Cheng
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