

## COAXIAL CAPACITOR

A coaxial cable has an inner solid conductor of diameter  $d$  embedded in a cylinder of dielectric of outer diameter  $D$ . The outside of the dielectric is wrapped tightly with aluminum foil.

- a. Find the capacitance per unit length of the cable directly from the definition of capacitance.
- b. For the cable widely used for carrying TV or computer signals, estimate how much free charge is stored in a 10-foot length when  $V = 0.5$  volt. Assume the dielectric is polyethylene.
- c. For the example in part **b**, how much polarization charge is stored?