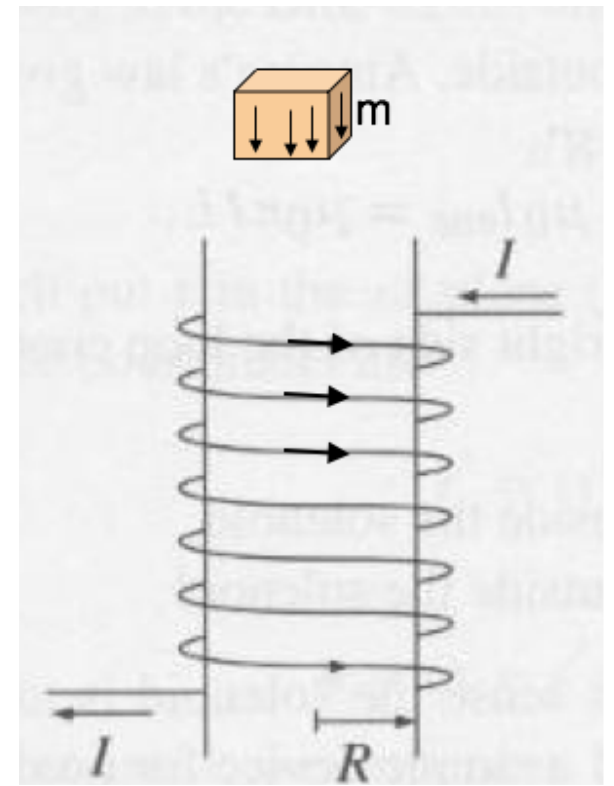


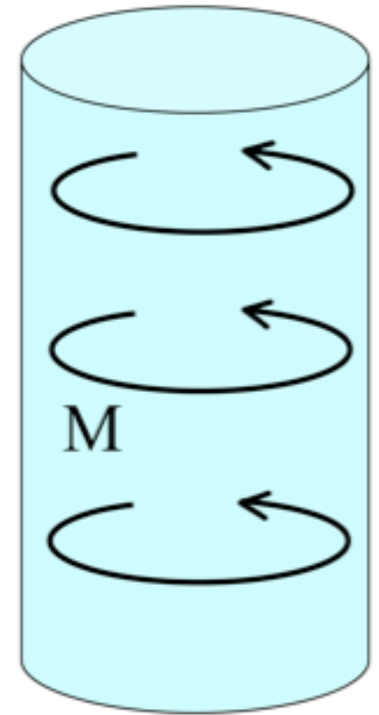
A small chunk of material (the “tan cube”) is placed above a solenoid. It magnetizes, weakly, as shown by small arrows inside. What kind of material must the cube be?

- A. Dielectric
- B. Conductor
- C. Diamagnetic
- D. Paramagnetic
- E. Ferromagnetic



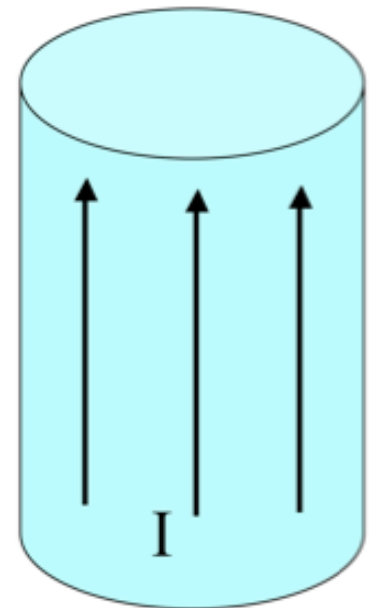
A solid cylinder has uniform magnetization \mathbf{M} throughout the volume in the ϕ direction as shown. In which direction does the bound surface current flow on the (curved) sides?

- A. There is no bound surface current.
- B. The current flows in the $\pm\phi$ direction.
- C. The current flows in the $\pm s$ direction.
- D. The current flows in the $\pm z$ direction.
- E. The direction is more complicated.



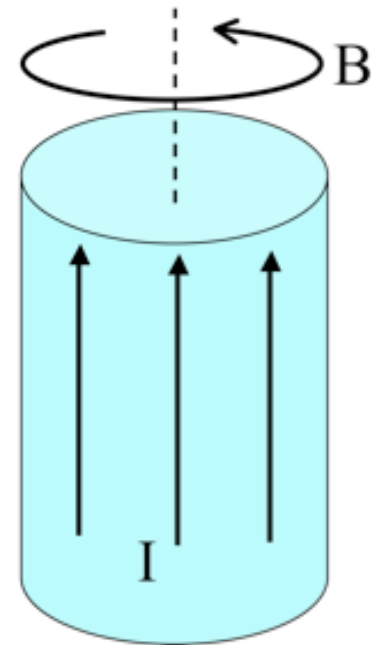
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the $+z$ direction. What is the direction of the bound volume current?

- A. \mathbf{J}_B points parallel to I
- B. \mathbf{J}_B points anti-parallel to I
- C. It's zero!
- D. Other/not sure



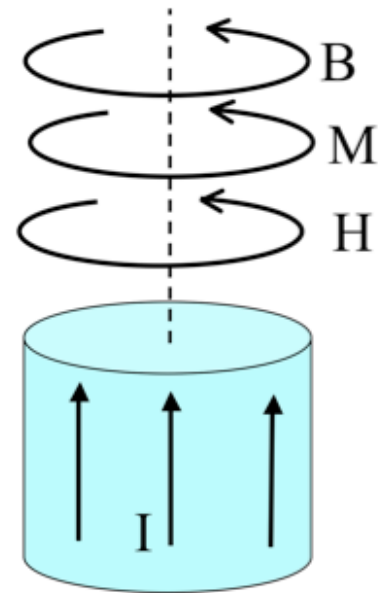
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the $+z$ direction. We know \mathbf{B} will be CCW as viewed from above. (Right?) What about \mathbf{H} and \mathbf{M} inside the cylinder?

- A. Both are CCW
- B. Both are CW
- C. \mathbf{H} is CCW, but \mathbf{M} is CW
- D. \mathbf{H} is CW, \mathbf{M} is CCW
- E. ???



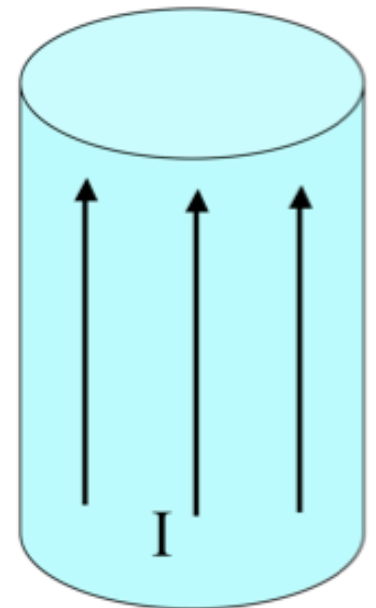
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the $+z$ direction. What is the direction of the bound volume current?

- A. \mathbf{J}_B points parallel to I
- B. \mathbf{J}_B points anti-parallel to I
- C. It's zero!
- D. Other/not sure



A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the $+z$ direction. What is the direction of the bound surface current?

- A. \mathbf{K}_B points parallel to I
- B. \mathbf{K}_B points anti-parallel to I
- C. Other/not sure



For linearly magnetizable materials, the relationship between the magnetization and the H-field is,

$$\mathbf{M} = \chi_m \mathbf{H}$$

What do you expect the sign of χ_m to be for a paramagnetic/diamagnetic material?

- A. para: $\chi_m < 0$ dia: $\chi_m > 0$
- B. para: $\chi_m > 0$ dia: $\chi_m < 0$
- C. Both positive
- D. Both negative