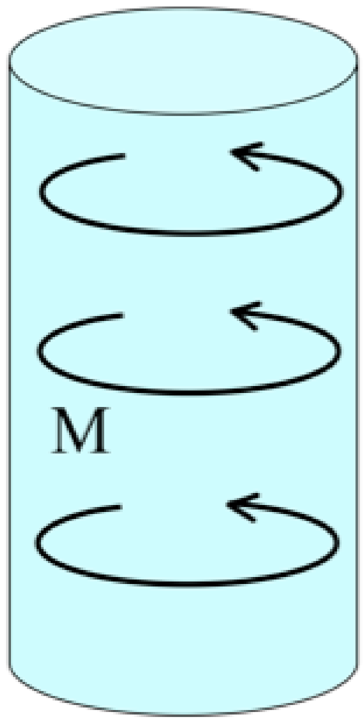
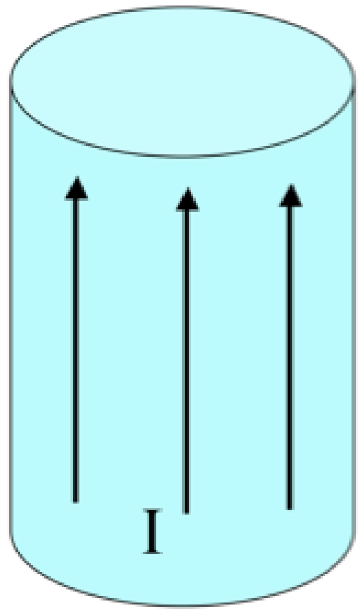
A solid cylinder has uniform magnetization $\mathbf{M}$ throughout the volume in the ϕ direction as shown. In which direction does the bound surface current flow on the (curved) sides?



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?

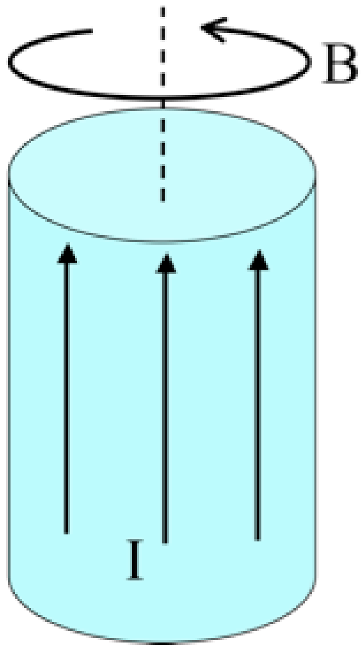
A. Both are CCW

B. Both are CW

C. $\mathbf{H}$ is CCW, but $\mathbf{M}$ is CW

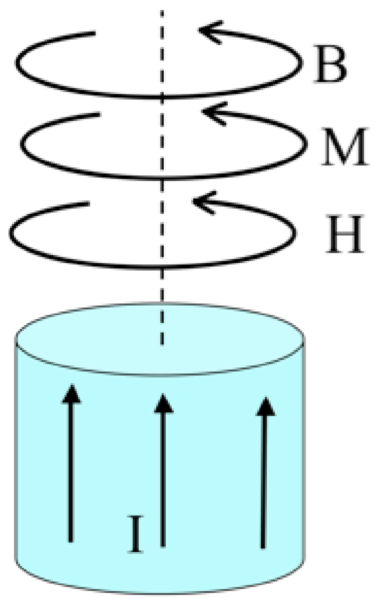
D. $\mathbf{H}$ is CW, $\mathbf{M}$ is CCW

E. ???



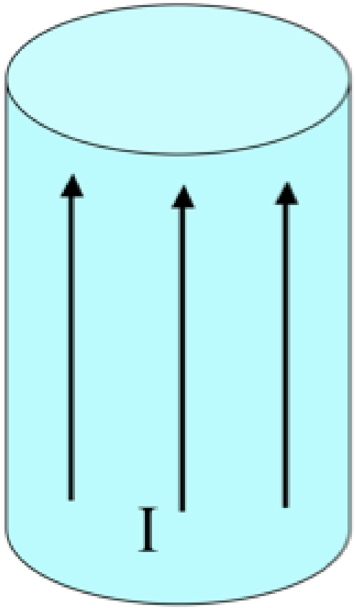
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the $+z$ direction. What is the direction of the bound volume current?

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 X_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