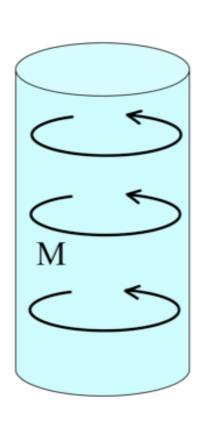
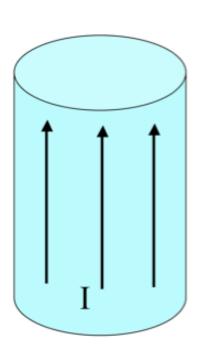
A solid cylinder has uniform magnetization M throughout the volume in the  $\phi$  direction as shown. In which direction does the bound surface current flow on the (curved) sides?

- 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.



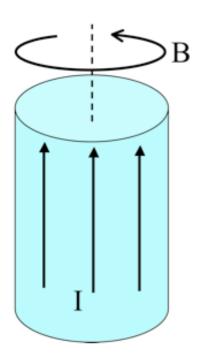
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the  $\pm z$  direction. What is the direction of the bound volume current?

- 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



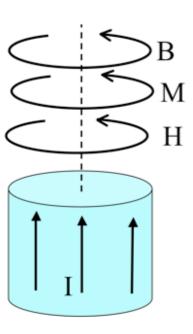
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the +z direction. We know  $\mathbf{B}$  will be CCW as viewed from above. (Right?) What about  $\mathbf{H}$  and  $\mathbf{M}$  inside the cylinder?

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



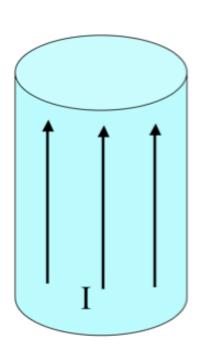
A very long aluminum (paramagnetic!) rod carries a uniformly distributed current I along the +z direction. What is the direction of the bound volume current?

- 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