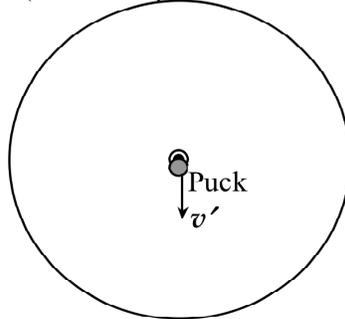


ACCELERATING REFERENCE FRAMES: ROTATING FRAMES

I. Motion on a rotating platform

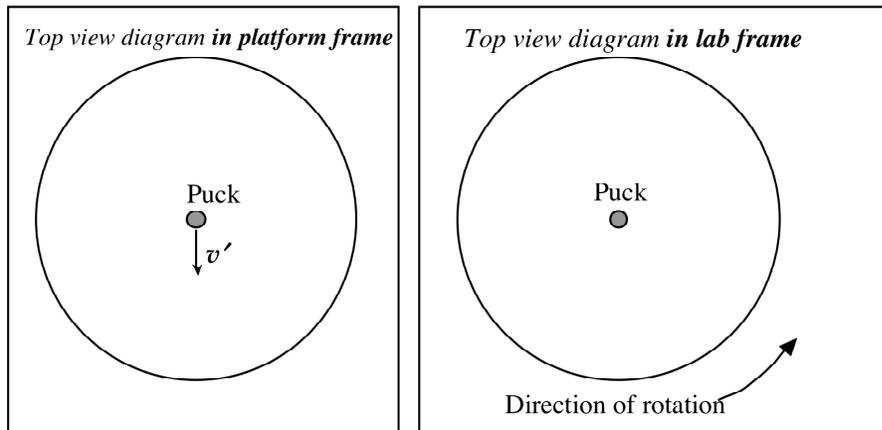
A level, frictionless platform rotates *counter-clockwise* at a constant rate relative to an inertial (or, “lab”) frame. Consider a reference frame whose origin is at the center of the platform and that is stationary relative to the platform. A puck on the platform has initial velocity \vec{v}' as measured in the platform frame.

Top view diagram in platform frame
(Platform spins CCW in lab frame)



- A. For the instant shown in the top view diagram, draw a free-body diagram for the puck, including all non-zero fictitious “forces.” (Draw from a top view, *i.e.*, ignore the gravitational and normal forces on each puck.) Discuss your reasoning with your partners.

The top view diagrams below show the locations of the pucks at the same instant. The first diagram is drawn in the *platform* frame; the second, in the *lab* frame.



- B. On the first diagram above, sketch a qualitatively correct path for the puck as viewed in the *platform* frame. Use your free-body diagram to support your answer. Discuss your reasoning with your partners.
- C. The 2nd diagram above, drawn in the lab frame, represents the same instant shown in the first diagram.
1. On the second diagram, sketch \vec{v} representing the initial velocities of the puck as measured in the *lab* frame. Clearly show the magnitude and direction.
 2. On the basis of your results, sketch a qualitatively correct path for the puck as viewed in the lab frame. Discuss your reasoning with your partners.