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On The Flows Of Low-Aspect Ratio Rotating Circular Cylinders¹ HISHAM SHEHATA, ALBERT MEDINA, MATTHEW ROCKWOOD, Air Force Research Laboratory, Wright-Patterson AFB, OH — A low-aspect ratio circular cylinder is placed on a laminar boundary layer plate in a wall-normal orientation, and rotated about its respective axial coordinate. It is found that the rotary motion of the cylinder may disrupt the symmetry of mainstay vortices associated with a static low-aspect ratio pin, resulting in a dominant streamwise vortex formation. Such formation stems from asymmetry of the near body wake, induced by cylinder motion and downwash effects at the free-end of the cylinder. The influence of cylinder aspect ratio, cylinder height to boundary layer thickness, and rotational rate are explored in detail through volumetric reconstruction of the flow field via stereoscopic particle image velocimetry (SPIV).

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