

Abstract Submitted
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Flow Behavior Around Coupled, Rotating Turbines in Steady Flow¹ MATTHEW FU, JOHN DABIRI, Caltech — Counter-rotating vertical axis turbines (VATs) have been shown to yield increased power density in wind farms as compared to typical horizontal axis wind turbine (HAWT) farms. However, the governing physical mechanisms remain poorly understood. Scale model experiments in a free-surface water tunnel were conducted to characterize the effect of parameters such as turbine separation, tip speed ratio, and flow speed on the downstream flow field and the resulting vortex shedding from VATs. The flow field was visualized using particle image velocimetry (PIV) and planar laser induced fluorescence. The results are compared and contrasted with recent studies of counter-rotating circular cylinders to determine if suppression of vortex shedding plays a similarly important role in dictating the overall wake dynamics.

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