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Simulations of Oscillating Hydrofoils in Array Configurations<sup>1</sup> JENNIFER FRANCK, FILIP SIMESKI, ARIANNE SPAULDING, Brown University — The vortex and wake interactions of multiple oscillating foils are investigated computationally for energy harvesting applications. Oscillating with high pitch and heave amplitudes to maximize power production, the elliptical-shaped foils generate large coherent vortices at the leading and trailing edge, which are shed downstream to create a large highly structured wake of vortices with alternating sign. Downstream foils oscillate within the large organized wake at a relative phase angle to the lead foil such that power efficiency is optimized. When placed directly downstream of one another, the optimal phase of a second foil is to avoid interactions with the first foils wake, generating less than half of the total power of the first foil. However, when placed in a staggered configuration the downstream foil has an increase in efficiency through constructive vortex-foil interactions.

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