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An Alternative Geometry for a Galloping Energy Harvester[1] SAM TUCKER HARVEY, PETR DENISSENKO, IGOR KHOVANOV, University of Warwick — Interest in aeroelastic energy harvesters has grown substantially in recent years due to their potential for low maintenance and low cost energy solutions, particularly with regard to autonomous electrical devices, such as wireless sensors. The development of aeroelastic energy harvesters to date has focused mainly on the flutter of airfoils, the galloping of prismatic structures and vortex induced vibrations as a means to generate energy. In this work an alternative geometry for a galloping energy harvester, initially inspired by the trembling of aspen leaves in barely noticeable flows, is investigated in two alternative configurations. The dynamics of a prototype device have been characterised experimentally with the use of a motion tracking system, while the flow patterns generated around the device have been evaluated by smoke wire visualisation and particle image velocimetry (PIV). In the second configuration the presence of a leading edge vortex is found to coincide with higher potential energy harvesting performance. The interaction of multiple harvesters within the flow field is also demonstrated to result in phase locking synchronisation.

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