Piezo-Electric Energy Harvesters: Robust, Performance-Based Design

Developing software for accurate and efficient numerical simulations of piezo-electric energy harvesters (PEHs), with an aim to obtain non-conventional designs for optimal and reliable performance. Piezo-electric energy harvesters (PEHs) are used to convert mechanical vibrations into electric power, enabling generation of energy from the environment to power small electronic devices.

Competitive advantage

- Leading-edge methods of computational mechanics and algorithms for shape and topology optimisation aiming to maximise the performance of piezo-electric energy harvesters
- Expertise with simulations based on the mathematical model of thin piezo-electric cantilever plates
- Able to incorporate uncertainties in the material parameters into the model, which enables the analysis of quantities of interests within a confidence interval

Impact

- Virtual simulations can substitute experiments and predict performance of a PEH for any geometry and material parameters. The design can be used for manufacturing high-performing devices.

Successful applications

- Design of devices of non-conventional shapes for maximum frequency and/or energy/area ratio

Capabilities and facilities

- Extensive expertise for modelling of CAD coupled with in-house bespoke software development

More Information

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