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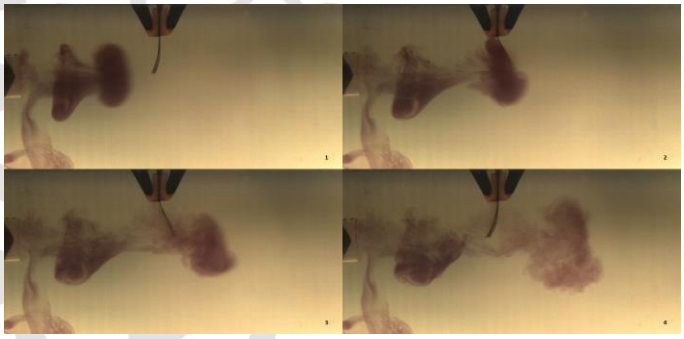

MAKING WAVES IN ENERGY RESEARCH

Sean D. Peterson and Maurizio Porfiri

From crashing waves to a brisk breeze, energy is constantly flowing around us. But how do we convert that energy into usable electricity?

For mechanical engineer Sean Peterson, the answer might lie in ionic polymer metal composites (IPMC)—synthetic, electro-active materials that produce a voltage when you apply mechanical force.

In recent experiments, he has immersed an ultra-thin strip of IPMC material at one end of a container of water and generated a vortex of swirling liquid at the other end. The vortex ring shoots across the container where it hits the IPMC strip, generating an electric charge.

Peterson and his colleagues have used a variety of tools, including time-resolved particle image velocimetry, to analyze exactly how energy is transferred from the vortex to the IPMC strip. It all adds up to a clearer picture of the mechanics—and potential—of fluid energy harvesting. Furthermore, Peterson demonstrates the feasibility of using IPMCs as a practical alternative to other electro-active materials that perform poorly in wet environments.

Peterson's work feeds a growing interest in small-scale energy harvesting systems. With real-world applications ranging from powering miniature electronic devices to enhancing underwater propulsion systems, the ability to extract power from our surroundings is making big waves in the world of sustainable energy.

Partners: Natural Sciences and Engineering Research Council; National Science Foundation