An Actuator Device Driven By Electrostatic Forces

Tech ID: 29661 / UC Case 2018-449-0

SUMMARY

Researchers in the UCLA Department of Materials Science and Engineering have developed an electrostatically actuated device with reversible high-frequency operation that consumes low power and has low fabrication costs.

BACKGROUND

Actuated devices, which use an input force to cause a desired motion, have numerous applications. For instance, piezoelectric forces have been used to control the movement of micromachined structures, and electromagnetic fields have been used to drive micromotors. Electrostatically actuated devices, which use the electrostatic force between two separated electrodes to induce movement, can be produced at low costs and have a small size and high reliability. However, static charges can become trapped between the two electrodes of these devices, creating an electrostatic sticking force that prevents the device from properly working and limits rapid, cyclical actuation. There is thus a need for an improved electrostatically actuated device capable of reversible high frequency operation.

INNOVATION

Researchers in the UCLA Department of Materials Science and Engineering have developed an electrostatically actuated device that consumes low power, has low fabrication costs, and achieves reversible high-frequency operation due to the fact that static charges do not become trapped between the device's two electrodes. The device thus overcomes the problem of electrostatic sticking force associated with current electrostatically actuated devices. Potential applications include small-form-factor solid-state microfluidic devices.

APPLICATIONS

- Cooling devices
- Microdevices and micromachined structures
- Miniature robots

ADVANTAGES

- Reversible high frequency operation
- Low power
- Low fabrication costs
- Flexible and compact

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,635,235	04/25/2023	2018-449

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Electrocaloric Cooling With Electrostatic Actuation
- Nanowire-Polymer Composite Electrodes
- A Phase-Changing Polymer Film for Broadband Smart Windows Applications

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OTHER INFORMATION

KEYWORDS

Electrostatic force; electrostatically actuated device; electrostatic actuator; MEMS; microfluidics

CATEGORIZED AS

- **Engineering**
  - Engineering
  - Robotics and Automation
- **Semiconductors**
  - Design and Fabrication

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