



TECHNOLOGY

Ultrasensitive Magnetolectric Thin Film Magnetometers

OVERVIEW

This invention pertains to ultrasensitive magnetic field sensors based on thin film magnetolectric devices operating at room temperature. The principle behind the high sensitivity detection of low frequency magnetic field is the elastic coupling of a magnetostrictive thin film layer to a piezoelectric layer.

Magnetolectric devices with sensitivity as high as 10-12 tesla have previously been demonstrated using bulk laminate samples. For room temperature operated magnetic field detection, such high sensitivity is simply unrivaled by any other known field detection mechanisms in a modular device configuration. The present invention takes such devices into the regime of microfabricated multilayer thin film structures, which would readily facilitate future integration of the device with various electronic components as well as development of novel sensor array systems. The thin film devices are fabricated on micromachined cantilevers in order to minimize the clamping effect of the substrate which acts to reduce the magnetolectric coupling of the bilayer.

This invention has applications as ultrasensitive magnetometers in a variety of fields. Because the devices operate at room temperature, they are much less expensive to implement than existing high sensitivity magnetic field sensors such as SQUIDs and Hall sensors. These devices can also be used in biomedical applications.

For further information, please contact the Office of Technology Commercialization, (301)405-3947 or E-mail: otc@umd.edu.

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

CATEGORIES

- Microelectronics
- Imaging devices

EXTERNAL RESOURCES

- [US Patent 7,345,475](#)

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