

NEWS | SEPTEMBER 03 2021

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Scilight 2021, 361104 (2021)

<https://doi.org/10.1063/10.0006241>



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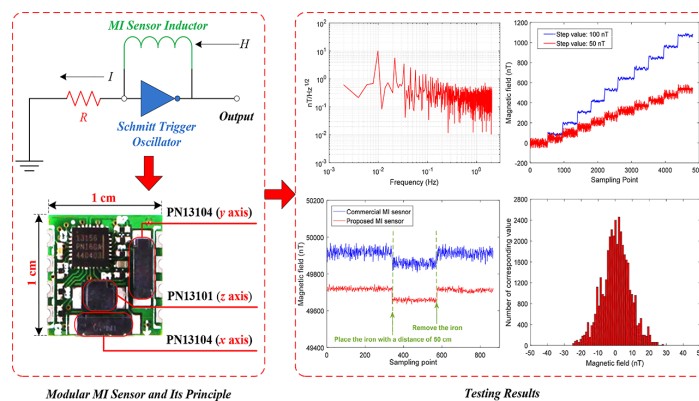
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Miniature sensor can measure magnetic field in smaller situations

Chris Patrick

A relatively small magneto-inductive sensor can measure the low vector magnetic field for applications where a fluxgate sensor is too large.



Many different fields and applications need to measure Earth's magnetic field. Usually, fluxgate sensors are used to precisely measure ambient vector magnetic fields. However, they are too big for some situations, such as measuring the ambient surface magnetic field of a superconducting radiofrequency cavity.

For scenarios like this, Liu et al. developed a miniature modular magneto-inductive sensor to measure the low vector magnetic field. Testing the sensor, they found it was able to detect a low magnetic field strength as low as 8.28 nanoteslas under certain conditions. The sensor was able to track the magnetic field well and can detect magnetic anomalies, demonstrating the feasibility of a miniature magneto-inductive sensor.

A common fluxgate sensor known as Mag-03 is 3.2 centimeters long, 3.2 centimeters wide, and 2.3 centimeters tall. At 1 centimeter long, 1 centimeter wide, and 0.2 centimeters tall, the small size of the developed magneto-inductive sensor allows it to overcome the bulkiness and heaviness of fluxgate sensors and other commercial devices available for measuring low vector magnetic field.

The authors believe the miniature sensor is suitable for various applications, including position orienting, inertial navigation, and security systems. To meet the needs of these applications, miniature magneto-sensors of the future need to be more precise. Next, the authors will attempt to improve the accuracy of the sensor, which is relatively low.

"This study lays the foundation for future works to improve the accuracy of the magneto-inductive sensor for magnetic field detection," said author Huan Liu.

Source: "A modular magneto-inductive sensor for low vector magnetic field measurements," by Huan Liu, Xiaobin Wang, Changfeng Zhao, Zehua Wang, Jian Ge, Haobin Dong, and Zheng Liu, *Review of Scientific Instruments* (2021). The article can be accessed at <https://aip.scitation.org/doi/full/10.1063/5.0063450>.

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