

Introduction of CPSS and Energy Harvesting Cases

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ABSTRACT: Founded in 1983, the China Power Supply Society (CPSS) is a non-profit and professional society in China at a national level. CPSS is dedicated to achieving scientific and technological progress of Chinese power supply and the development of the power supply industry. In addition to the noticeable conventional power supplies technology development in China, there are more and more research activities in the area of energy harvesting for, a promising technology for powering future vast IoTs.

Introduction of CPSS

CPSS have 5000+ individual members and 400+ enterprise members. CPSS consists of 12 professional committees and 10 working committees. It also involves 9 local related Power Supply Societies.

More than 20 academic & technology conference in various fields of power supply every year. Notable events include:

Flagship event – CPEEC & CPSSC:

- China Power Electronics and Energy Convention Conference (CPEEC)
- China Power Supply Society Conference and Exposition (CPSSC)

International event:

- International Power Electronics and Application Conference and Exposition (PEAC)
- International Power Electronics and Application Symposium (PEAS)
- International Symposium on Energy Storage and Conversion (ISESC)



Fig. 1 CPEEC & CPSSC 2023



Fig. 2 CPSS TPEA

CPSS edits and publishes several periodicals:

- CPSS Transactions on Power Electronics and Applications
- Journal of Power Supply
- Yearbook of China Power Supply Industry
- CPSS-Springer Series of English books in power electronics

CPSS also focuses on Continuing Studies and Technical Training. CPSS offers kinds of courses and seminars annually, especially combined current technical hot issues and difficulties.

The CPSS website (www.cpss.org.cn/En/Index) offers online member registration, information publishing, technology forums, product promotions, web-based training, and recruitment.

Introduction of research activities in energy harvesting

A Novel Self-Powered Wireless Rollers Rotational Speed Monitoring System

- Collects kinetic energy from rotating rollers.
- Achieves output power of 23.5mW at 800 rpm and 1.8mW at 100 rpm.
- Transmits speed data to Cloud platform via Zigbee and NB-IoT.



Fig. 3 Cloud based UI

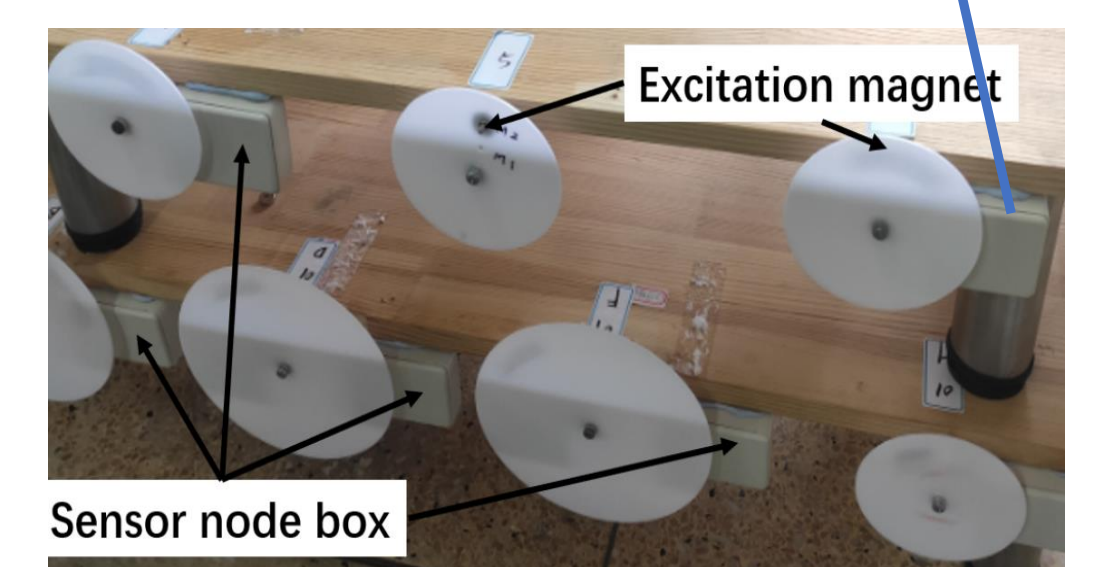
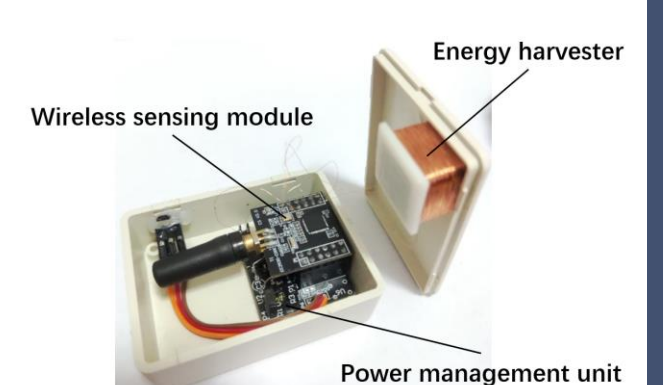


Fig. 4 Test bed for the wireless speed monitoring system.

4-in-1 Quasi-Static-Toggling (QST) Mechanical Energy Harvester(MEH)

- Uses a deformable iron cantilevered beam to create a monostable QST EH.
- Harvests 0.25 mJ of energy per press-release action.
- Power an iBeacon to send voting data to Cloud for visualization.

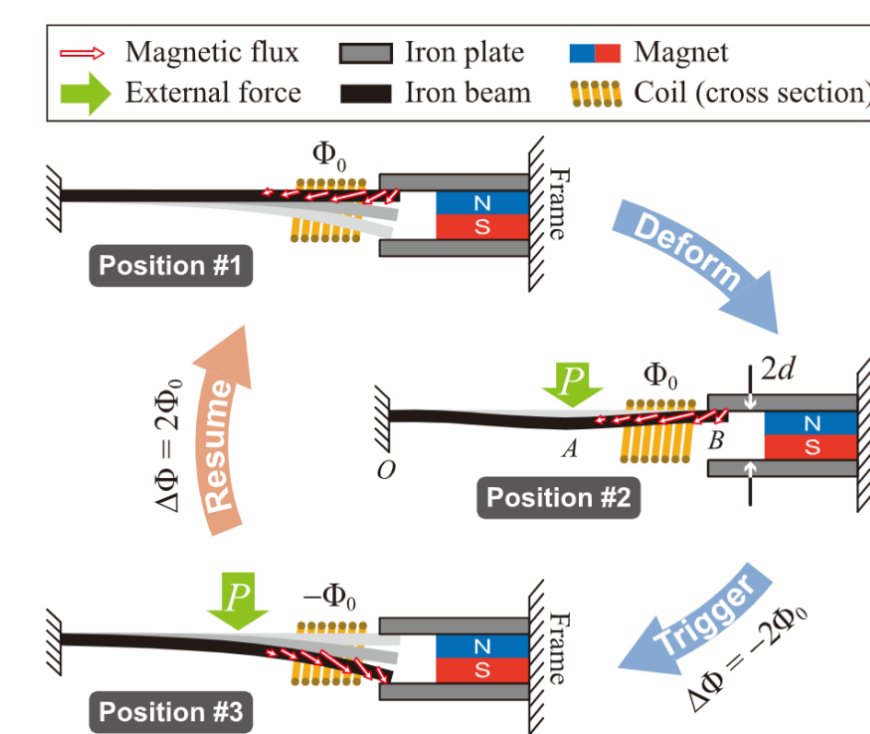


Fig. 5 Press-release operation on QST.

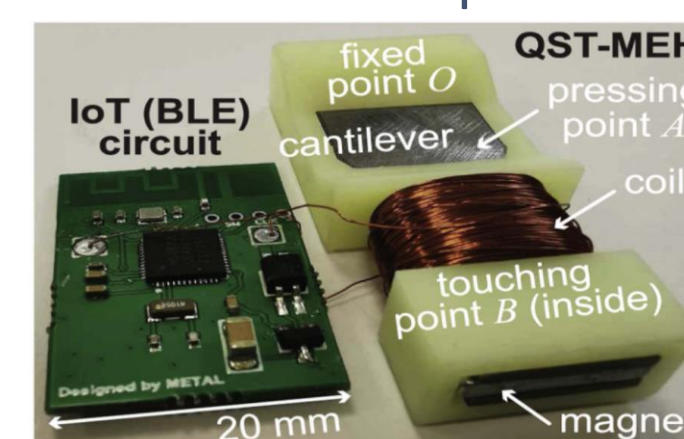


Fig. 6 QST-MEH prototype.

Electromagnetic Energy Harvester for Vibration and Magnetic Field Energy for grid monitoring

- Uses a flexible bended strip permalloy core, producing 59.9mW at 115A AC
- Weighs less than 100g .
- Includes a temperature sensor with 4G communication.
- Installed on 10kV power line and operates well for about 1 year.

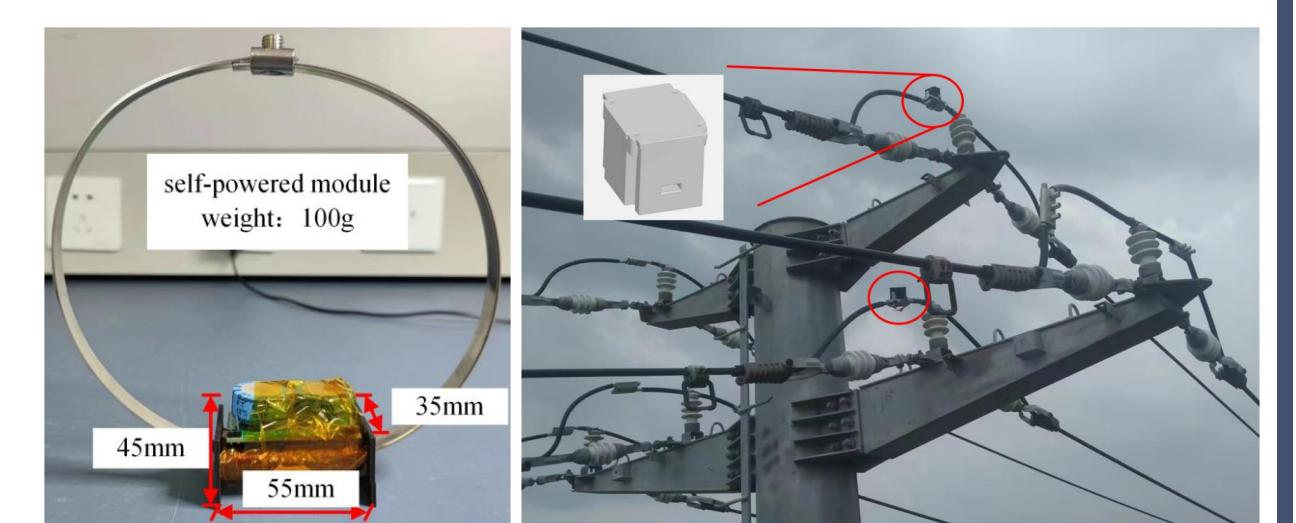


Fig. 7 Magnetic field energy harvester (left). Module installed on 10kV power line(right).

Summary

- CPSS drives power supply innovation in China, fostering academic and industry collaboration to advance technology and set industry standards.
- CPSS will work tirelessly alongside with scientists and enterprises to achieve greater breakthroughs & development in power supply technology.
- Energy harvesting is gaining a lot of attention in China as a key technology for future IoTs.
- The research outputs demonstrate that energy harvesting provides a effective, reliable power source for wireless sensors invarious applications.

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