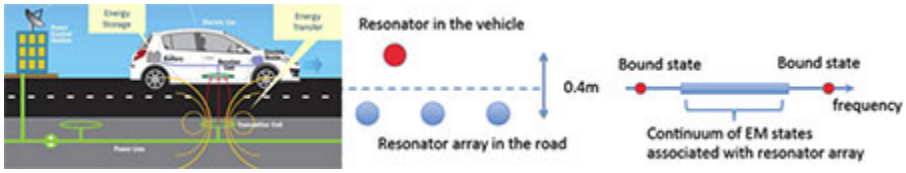
Docket #: S15-332

Wireless Power Transfer

Stanford researchers developed a wireless power transfer mechanism that will charge devices while on the move, or in use. The mechanism uses a parity-time symmetric circuit incorporating a nonlinear gain saturation element. Efficiency and power transfer are constant over varying range without tuning - enabling wireless 'on the go' charging. Consumer, medical, and industrial electronics will be more robust, reliable, convenient, and safer through the elimination of cables, wires and battery replacement.



Stage of Research - Prototype
Researchers have verified theory with experiments on a radio frequency circuit. Research is ongoing.

Applications

- **Wireless power transfer** to **electric vehicles** while in use.
- **Wireless power transfer** to **portable electronics** – devices can be wirelessly charged while in use.
    - Ideal for devices used in harsh or hazardous environments.

Advantages

- **Constant transferred power level** over a range.
- **Convenient** charging on the go could **increase EV effective driving range** and EV adoption.

- **Increased mobility and safety for patients** with implantable medical devices, neurostimulators.
- Handheld medical instruments, and diagnostic equipment can be charged on the go, **eliminating need for cables**, and stationary charging.
- **More convenient, reliable, automatic charging and direct wireless power** for: mobile phones, handheld devices, printers, displays, robots, cordless tools and instruments.
- **Increased design flexibility and robustness** for thinner, waterproof devices - eliminates failure prone wiring, complex docking and battery replacement.

Publications

- ANDREWS, EDMUND L. Stanford researchers one step closer toward enabling electric cars to recharge themselves wirelessly as they drive, Stanford News, 4 May 2020.
- S. Assawaworrarit, X. Yu, S. Fan. Robust wireless power transfer using a nonlinear parity-time symmetric circuit, Nature 546 (2017), 387-390.
- Wirelessly Transmitting Electricity, Stanford Enginnering News, 15 June 2017.
- Mark Golden and Mark Shwartz, Wireless charging of moving electric vehicles overcomes major hurdle in new Stanford research, Stanford News, 14 June 2017.
- Shwartz, Mark. Wireless power could revolutionize highway transportation, Stanford researchers' say (2012).

Patents

- Published Application: 20180241252
- Issued: 10,931,146 (USA)

Innovators

- Sid Assawaworrarit
- Xiaofang Yu
- Shanhui Fan

Licensing Contact

Jon Gortat

Licensing & Strategic Alliances Director for Physical Science

Email