CPS: Breakthrough: Charge-Recycling based Circuit Paradigm for Wirelessly Powered Internet-of-Things

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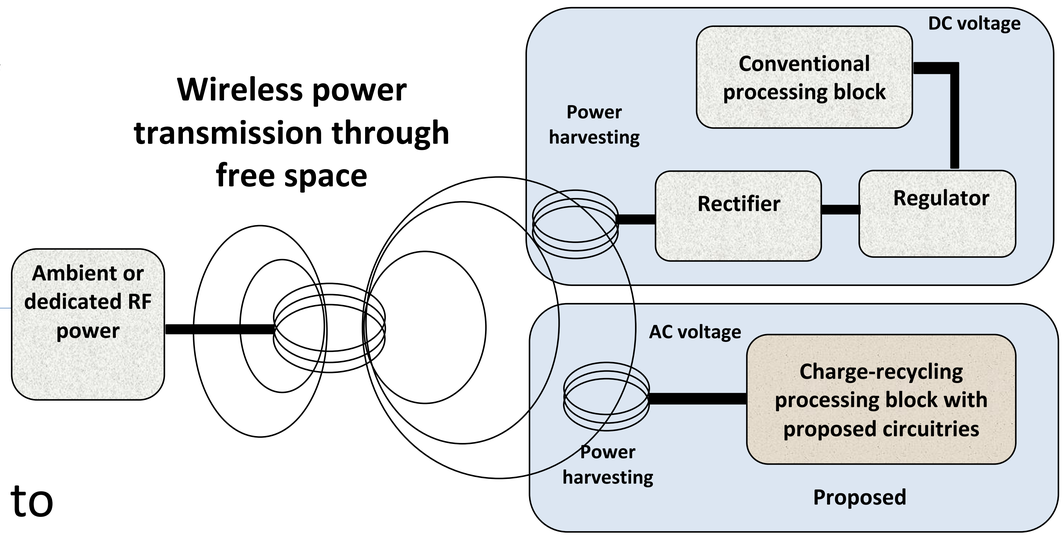
Challenge:

- RF-powered applications have limited compute resources due to low energy budgets
- Local data processing is highly challenging

Solution:

- Leverage adiabatic computing to eliminate lossy stages and reduce power consumption
- Developed *AC computing methodology* to run the digital logic directly with harvested energy
- Fabricated a test chip in 65 nm CMOS technology



Potential Applications

IoT Security

Structural health monitoring

RFID

Scientific Impact:

- More than 27X improvement in energy efficiency
- Enables powerful local compute capability
- Edge inference
- Enhanced hardware security

Broader Impact:

- Two PhD students graduated
- One issued, one pending patent applications
- Contributions to IoT certificate program