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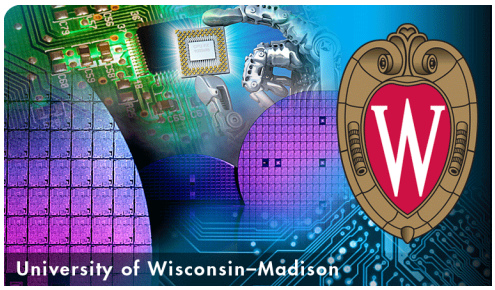
TECHNOLOGY LICENSING OPPORTUNITY



Nano-Mechanical Computer Based on Nano-Electro-Mechanical Transistors

INVENTORS • Robert Blick, Robert Marsland

WARF: P07203US

View U.S. Patent No. 7,414,437 in PDF format.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a robust alternative to conventional transistors.

OVERVIEW

Conventional integrated circuits, such as complementary metal-oxide-semiconductor (CMOS) circuits, allow large numbers of transistors to be combined into electronic gates. These gates control the flow of current and may be interconnected within the circuit to create more complex logical devices, such as arrays or computers.

Conventional circuits using transistors have some significant limitations. They can be disrupted by radiation (common in space shuttle applications, for example), have limited operating temperatures and may have difficulty operating at extremely low voltages.

THE INVENTION

UW-Madison researchers have developed a robust alternative to conventional transistors: a nano-electro-mechanical transistor based on the nano-electro-mechanical single electron transistor (NEMSET). These nanoscale switching elements may be interconnected in the same way as conventional circuits to create a nano-mechanical computer with the benefits of NEMSET. However, they offer the benefit of being immune to radiation disruption, and the design holds promise for extremely low power dissipation. They can be readily constructed using standard integrated circuit techniques, and can operate at temperatures far exceeding conventional transistors (up to 500°C).

Nano-mechanical computers have operating speeds on the order of 1 GHz. While this speed is not competitive with traditional CMOS technology, it is sufficient for applications like cell phones, calculators and other micro-controllers, which require robust and low power consumption.

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

APPLICATIONS

- Nano-mechanical computers

KEY BENEFITS

- Mechanical elements are more resistant to electromagnetic shocks than current dynamic random access memory (DRAM), which is based purely on CMOS technology.
- Power use can be orders of magnitude lower than current CMOS technology.
- Can operate using a DC voltage source, potentially increasing battery life
- Operating temperature can be an order of magnitude above that of conventional CMOS technology (up to 500°C).
- Can withstand radiation, unlike conventional transistors
- Nano-mechanical computers can be realized on silicon substrates.
- Can be combined with traditional CMOS circuitry
- An integrated, nano-mechanical circuit can be fabricated via inexpensive optical lithography, a conventional semiconductor circuit manufacturing process.

ADDITIONAL INFORMATION

Tech Fields

Semiconductors & Integrated Circuits - Components & materials
Micro & Nanotech - MEMS & NEMS

CONTACT INFORMATION

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854.