Researchers at the University of South Florida have invented a novel device & method to prevent soft errors in logic circuits that result from radiation.

In circuit innovation, technology scaling refers to the advancement of semiconductor technology by reducing the size of the components and increasing their number on the chip. A challenge computer technology innovators face in scaling is overcoming errors in the circuit caused by radiation, as these miniaturized circuits are more prone to transient glitches due to radiation strikes. The major source of these glitches is the generation of soft errors, which result from radiation particles hitting the transistors in the circuit. Examples of these adverse radioactive particles are energetic neutrons entering the atmosphere from space and alpha particles that arise from device packing materials. Current approaches for avoiding soft errors in logic circuits often incur significant overheads in terms of delay, area and power.

To prevent the generation of soft errors, USF inventors have designed a novel circuit device called “Radiation Jammer,” or RADJAM™. The device detects radiation strikes and shields critical components from the effects before they reach them. In addition, the inventors created an algorithm to determine the optimal placement of the device into the circuit to protect the most vulnerable components. The test results showed that RADJAM™ optimized circuits can significantly reduce soft error rates (SER) with marginal overheads in terms of delay and area. This invention is a vital advancement for circuit miniaturization that will benefit all industries supported by microchips and computers.

**ADVANTAGES:**
- Eliminates generation of transient glitches
- Selectively protects most vulnerable nodes
- Marginal overheads in delay and area

**Novel Device Protects Vulnerable Circuit Components from Radiation Strikes**

**Comparison of SER Reduction for Different User Defined Parameters. “M” is the Percent of Nodes Selected.**

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