**Silicon Photonic Devices With Tunable Temperature Dependence**

**UA ID Technology #ua18-011**

**Title:** Silicon Photonic Devices With Tunable Temperature Dependence

**Invention:** Researchers at the University of Arizona have developed an athermal multichannel optical add-drop multiplexer (OADM) which is based on silicon microring resonators. Using a means of controlling the thermo-optic coefficient of certain materials, the researchers have reduced the temperature dependent wavelength shifts to achieve athermal condition for various waveguide structures.

**Background:** The emergence of social media, video streaming, online gaming, and OIT has led to significant increase in demand for data transfer and file sharing. Datacenter and high performance computing are struggling to keep up because of thermal management challenges and limitations from electrical interconnects. The transition to photonic devices would provide reliability, low cost, and increased functionality and support higher bandwidth, denser interconnects, reduced crosstalk and more advantages. However, with a silicon photonics platform, silicon’s thermo-optic coefficient can limit the application of these devices where large temperature changes are experienced.

**Advantages:**

- Reduced thermal shifts for waveguides
- Minimal alteration to known materials
- Wide variety of athermal optical devices can be fabricated

**Applications:**

- Individual waveguide fabrication
- Complex optical waveguide circuits
- Telecommunications

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