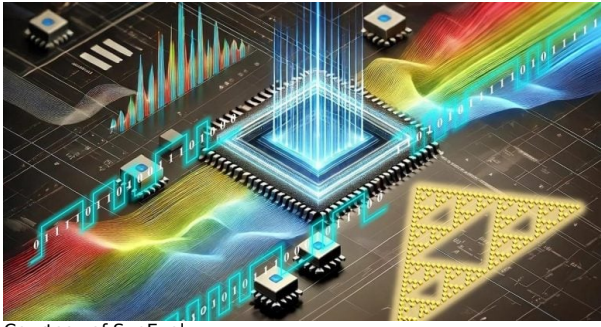


# Innovative Optical Array Transforms Computing

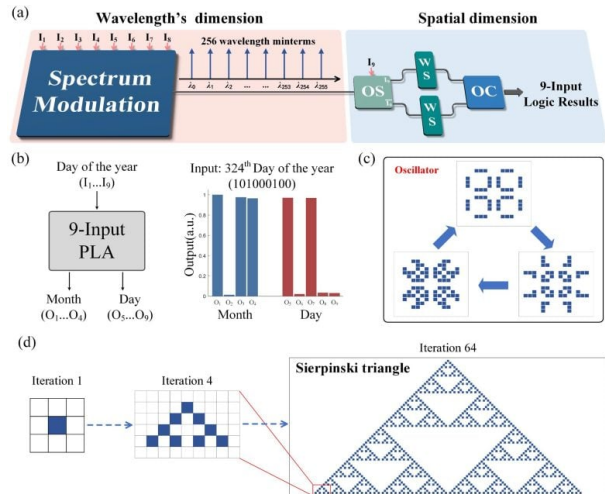
Posted by [Okachinepa](#) 11/04/2024



Courtesy of SynEvol  
Credit: Wenkai Zhang

Researchers have been looking for ways to use light for computing for years in an effort to outperform traditional electronic systems in terms of speed and energy usage. High parallelism and efficiency are two potential benefits of optical computing, which uses light rather than energy for computations. Its practical applications are limited, nevertheless, by the difficulty of implementing complicated logic operations with light.

Researchers from the Wuhan National Laboratory for Optoelectronics and Huazhong University of Science and Technology have now made a major advancement in this area. They have created a large-scale optical programmable logic array (PLA) that can do intricate calculations, as reported in *Advanced Photonics*. This optical PLA significantly expands the range of optical logic operations by utilizing parallel spectrum modulation to create an 8-input system.



Courtesy of SynEvol  
Credit: Wenkai Zhang

Conway's Game of Life, a popular two-dimensional cellular automata, was successfully executed by the researchers to showcase the capabilities of their optical PLA. With this accomplishment, a complicated model without the need for electronic components for nonlinear computing has been implemented for the first time on an optical platform. The optical PLA's adaptability and promise for wider applications in digital computing are demonstrated by its capacity to handle sophisticated logic operations including decoders, comparators, adders, and multipliers.

This ground-breaking breakthrough offers a new platform for simulating complicated events in addition to advancing the field of optical computing. The optical PLA's ability to handle complex computational tasks is demonstrated by the researchers' effectiveness in running a variety of cellular automata models, such as the Sierpinski triangle. The pursuit of using light to create computing systems that are more potent and efficient has advanced significantly with this advancement.