

Seminar

An Energy-Efficient Reconfigurable Nanophotonic Computing Architecture Design: Optical Lookup Table

We present an energy-efficient on-chip reconfigurable computing architecture, the so-called OLU_T, which is an optical core implementation of a lookup table. It offers significant improvement with respect to optical directed logic architectures, through allowing the use of wavelength division multiplexing (WDM) for computation parallelism. We performed a design space exploration that elucidates the add-drop filter characteristics needed to produce a computing architecture with high computation reliability (BER~10⁻¹⁸) and low energy consumption. Analytical results demonstrate the potential of the resulting OLU_T implementation to reach <100 fJ/bit per logic operation, which may meet future demands for on-chip optical FPGAs.

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