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[404] Integrated polariton condensate in silicon-on-insulator high contrast grating microcavities

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Integrated all-optical logic could define a new paradigm for computing architectures. Strong light-matter coupling based all-optical transistors exhibiting ultra-fast switching and room-temperature operation have recently been demonstrated using free-space optical setups. Here, we leverage silicon-on-insulator (SOI) technology to realize high-index contrast grating (HCG) as mirrors to form microcavities filled with an organic polymer (MeLPPP) as photoactive material to demonstrate room temperature strong light-matter interaction and polariton condensation on chip. This opens the door to integrated all-optical transistors with the scalability to enable more complex optical logic circuits to operate at room temperature with sub-picosecond switching times.

Theoretical Work

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