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Demonstration of Wavelength Tunable Silicon Raman Laser OZDAL BOYRAZ, BAHRAM JALALI, University of California, Los Angeles — The need for low cost photonic devices has stimulated significant amount of research in silicon photonics. One approach that has been pursued for light generation and amplification is the utilizing high Raman gain coefficient in silicon. However, free carrier generation due to two photon absorption limited the achieving high Raman gain. Pulsed pumping technique has been utilized to mitigate free carrier accumulation and achieve high gain. We report the demonstration of a Raman laser in silicon waveguide by pulsed pumping technique. A pump laser with 25 MHz repetition rate at 1540 nm and with 30 ps pulses is used to obtain Raman laser in silicon. Lasing is measured at 1675 nm. A clear lasing threshold is observed at 9W peak pulse power along with a slope efficiency of 8.5% above threshold. Temporal and spectral profiles of the silicon Raman laser are studied experimentally. We also demonstrated wavelength tunability of the silicon Raman laser by varying pump wavelength and modifying the cavity resonance. Experimentally we measure lasing from 1667 nm to 1700 nm in silicon.

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