

## ABSTRACT

Thermal efficiencies are being compared for different material of different widths to get the maximum thermal efficient heater. To reduce the power loss in the data transfer and communication industry we attempted to design the phase shifter of maximum thermal efficiency. These losses are due to the destructive interference of the light coming from the limbs of Mach-Zehnder interferometer in integrated heaters. So, models of the phase shifter of different widths are being designed with the help of simulation. Later, the detailed analysis is being done to construct the maximum efficient heater of that width with minimum losses. The analysis was done by taking the widths  $7\mu\text{m}$ ,  $2.5\mu\text{m}$  and  $0.45\mu\text{m}$  and the resulting efficiencies were  $0.28\text{K}/\text{mW}$ ,  $0.49\text{K}/\text{mW}$  and  $0.51\text{K}/\text{mW}$  respectively. Thermal efficiencies were also being compared by considering the air gaps in substrate of widths  $2\mu\text{m}$ ,  $5\mu\text{m}$  and  $10\mu\text{m}$ , but the thermal efficiency was found same  $0.51\text{K}/\text{mW}$ . So, there was no effect of the air gap in Si substrate on the thermal efficiency of the integrated heaters.