

## Photodetector performance enhancement using an electron accelerator controlled by light

### Abstract:

A new method of photodetector performance enhancement using an embedded optical accelerator circuit within the photodetector is proposed. The principle of optical tweezer generation using a light pulse within a PANDA ring is also reviewed. By using a modified add-drop optical filter known as a PANDA microring resonator, which is embedded within the photodetector circuit, the device performance can be improved by using an electron injection technique, in which electrons can be trapped by optical tweezers generated by a PANDA ring resonator. Finally, electrons can move faster within the device via the optical waveguide without trapping center in the silicon bulk to the contact, in which the increase in photodetector current is seen. Simulation results obtained have shown that the device's light currents are increased by the order of four, and the switching time is increased by the order of five. This technique can be used for better photodetector performance and other semiconductor applications in the future.