

**[ME02]**

**Model of coherent photon detection in a lateral PIN photodetector structure**

**Esther Loo Chee Hong, Sahbudin Bin Hj Shaari, Burhanuddin Bin Yeop Majlis**

Photonics Technology Laboratory, Institute of Micro Engineering, and Nanotechnology. University Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.

E-mail: esther@vlsi.eng.ukm.my

This paper concentrates on the theoretical understanding and modeling of photon absorption in a lateral structure silicon PIN photodetector. The device response and characteristics when illuminated with a very high coherent light pulse can only be theoretically determined by numerical simulation. By using the drift-diffusion model, we solve the classical transport equations for electrons and holes. A 2D simulated structure of a silicon lateral PIN photodetector is modeled using MATLAB and the related current is obtained. A set of very precise photo current characteristics is calculated based on individual drift changes of electrons arriving at the electrodes in a very short time period at an interval of 3 fs. 10 $\mu$ m, 20 $\mu$ m, 30 $\mu$ m and 40 $\mu$ m were the set of gap size or intrinsic layer chosen here for at the random bombardment of 10 photons per frame for 800 frames.