

WP3- INFN-CT

Innovative Silicon Carbide APD



Finanziato
dall'Unione europea
NextGenerationEU

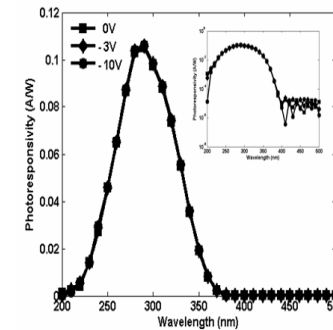


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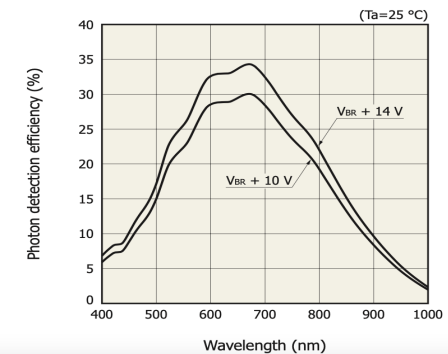
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- WP3-INFN aims to the development of a SiC-based, visible-blind, avalanche photodiode with:
 - ❖ Single photon detection capability
 - ❖ Fast Signal Responce
 - ❖ Sensible to UV light
 - ❖ Radiation Hardness
- Two applications in mind:
 - ❖ Fast timing in ToF-PET using prompt Cherenkov radiation
 - ❖ UV-Photon Spectroscopy for environmental applications
- Future possible application in Particle Physics:
 - Cherenkov detection in Dual Readout Calorimeters



SiC

■ Photon detection efficiency vs. wavelength (typical example)

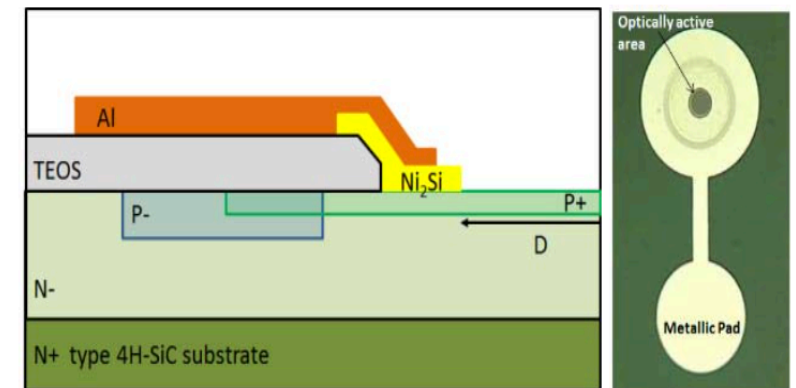
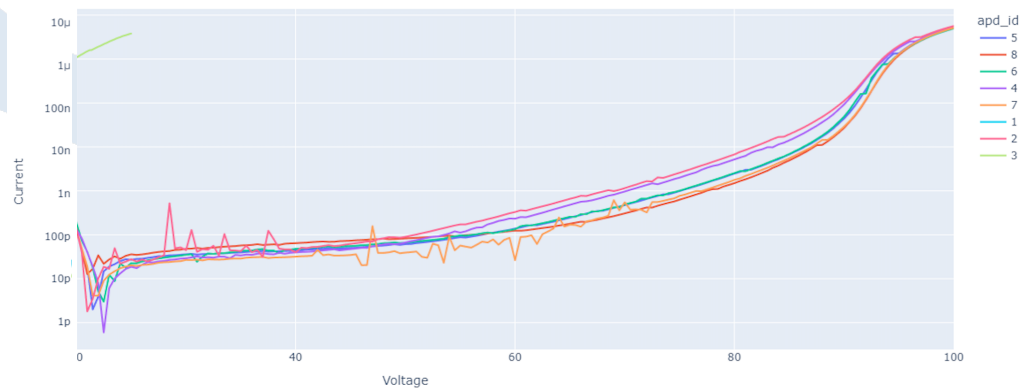


SiPM

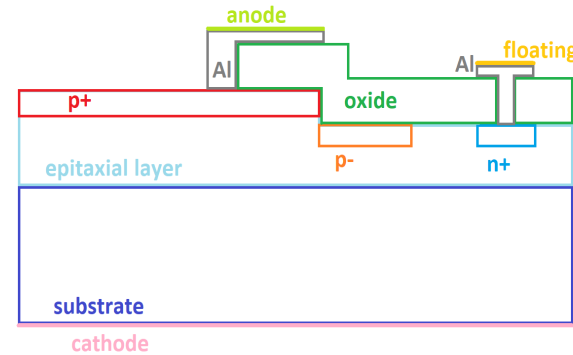
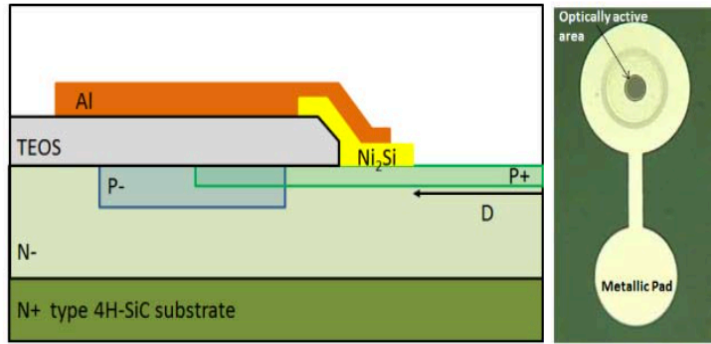
SiC Avalanche photodiodes (APD) is the step forward towards:

- ❖ Single Photon Counter in the UV band/solar blind
- ❖ Silicon Carbide Photomultipliers

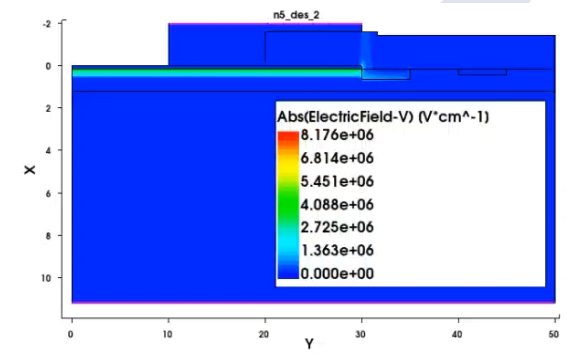
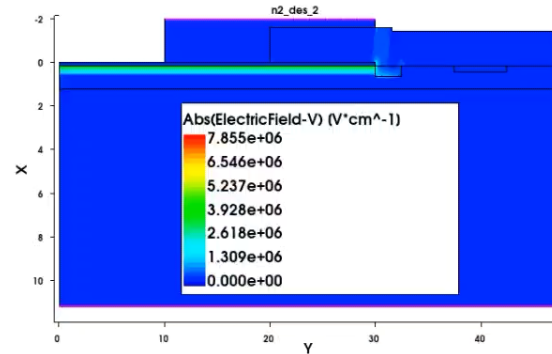
The subsequent step will be the development of an array or a matrix of silicon carbide APD's.



A.Sciuto et al:IEEE SENSORS JOURNAL, VOL. 17, NO. 14, JULY 15, 2017



An intense simulation campaign has been performed in order to define a new APD design. Mainly using Synopsys TCAD package by Sentaurus Productio has started at SiC APD production to ION BEAM SERVICES S.A., Peynier France



CONCLUSIONI

- Il PNNR ha liberato molte attività di sviluppo tecnologico i cui risultati potranno avere una significativa ricaduta sulla fisica sperimentale agli acceleratori.
- Questo contributo presenta un esempio di come uno sviluppo di fotorivelatori SiC a valanga, finanziato per applicazioni a medicina e ambiente, possa avere notevoli applicazioni in calorimetria adronica di prossima generazione per la rivelazione di luce Cherenkov in Dual Readout Calorimetry.



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