

ATTRACT TWD Symposium: Trends, Wishes and Dreams in Detection and Imaging Technologies



Contribution ID: 85

Type: **not specified**

PYXGEN: A novel charge domain global shutter pixel platform for scientific imaging with automated generator

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In nowadays technology, most advanced features are developed for consumer grade application whereas some of those technologies could be very beneficial for scientific imaging. In particular for quite a vast range of applications, ultra-low noise global shutter pixels are becoming more and more interesting. High speed low noise imaging in biology application, or earth observation satellites are looking for such architecture. However, using advanced technology node (65nm and below) to achieve state of the art performances has a significant cost. In this project, we propose a way to offset the costs by creating a dynamically generated pixel array dedicated to scientific imaging.

We propose to develop a versatile pixel platform for scientific usage. The platform is meant to be scalable with the following targets:

- Noise floor: below $2e^{-}$
- Global shutter
- Pixel pitch: scalable, from 4,5um up to 100um
- Image sensor diagonal: from a few pixels to waferscale imager.

The goal of this development is not only to demonstrate such performances for scientific imaging but also to create a true platform, following the example of RAM block arrays: a generator will be design to quickly generate a pixel array with dedicated peripherals using simple parameters such as: number of pixels X and Y, pixel pitch, shutter types, Full-well, digital or analog sensor, etc. This will speed up design time and will benefit the entire scientific imaging community with a more affordable route to high performance imaging technologies.

Summary

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