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PYX-XL: World largest resolution sensor for scientific applications

In commercial, consumer grade sensors, the sensor size tends to decrease every years, optimizing costs in mobile applications. However, similar technologies can be used to create very large detectors that are required to make progress in scientific imaging. It is particularly the case in electron beam microscopy, synchrotron or in earth observations with the possibility even to achieve by 2025 geostationary earth observation sensors. Furthermore, there are existing synergies with professional imaging.
Through this project, we propose to design and manufacture the world largest resolution sensor. It is also the largest monolithic sensor with a 29mm diagonal (8x10 optical format). To design such sensor, several challenges have to be overcome: first, the number of pixels is so high that a traditional matrix organization with readout on the edges will not work anymore. Thus, an organization in array of readout, scarifying optical columns and lines, has to be accommodated. To minimize the number of inactive cells, the sensor will have to be 3D stacked using through silicon via. The readout ASICs will be custom designed as well to handle the data output.

Summary

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