Revised Outline

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1. Introduction

* What is CIS?
* Basic structure of CIS.
* The main problem is increase QE and decrease crosstalk.
* In the side of a camera sensor, the light is oblique. Therefore, it needs shifted structure. However, it has very low QE. Then, how can we more increase QE?

1. Materials and Methods
   1. Materials
      1. OC&ML are composed of SiO2. The OC&ML focus light on CIS. CF is composed of materials which have high transmittance at red, green, blue and white light each matched CIS. The CF serves to filter the light of the desired wavelength range.
      2. DTI is composed SiO2. DTI prevent external light from neighbors CISs to the detector area and leakage of internal light.
      3. QE is a variable which shows how much desired wavelength light is detected. Crosstalk is a variable which shows how undesired wavelength light or external light from neighbors are detected.
   2. Methods
      1. CIS simulated by FDTD simulations which is electromagnetic problem solver from Lumerical Inc.
      2. Shift OC&ML as d1 [nm] by 10 nm step from 450 nm to 550 nm. Also, Shift CF as d2 [nm] by 10nm step from 200 nm to 300 nm. Tilt DTI as by 0.5 step from to .
2. Results
   1. QE and Crosstalk
      1. Find the biggest QE from the result graph.
      2. Find the smallest Crosstalk from the result graph.
   2. Optimum Values
      1. The optimum setting is d1=510 (nm), d2=230 (nm), and .
3. Discussion

* Its QE increase 3%. Also crosstalk (X-talk) increase, but it is < 0.1%.
* The problem from applying real CIS because of dark current.