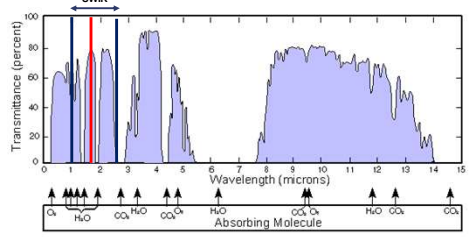


## Context

InGaAs Photodiode detects in the SWIR range



$\lambda_c \sim 1,75 \mu m$

### Space Applications

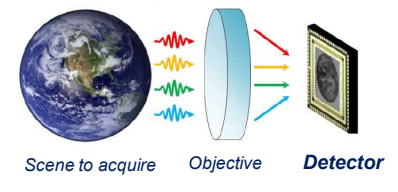
- Earth observation (vegetation)
- Telecommunication

### GOAL

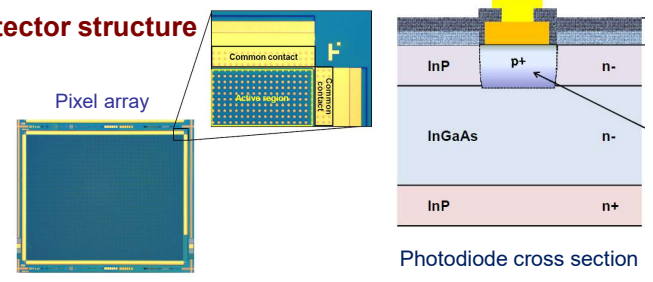
- Make the detector **radiation-harder**



### Detection process



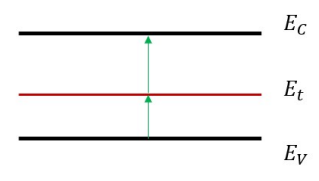
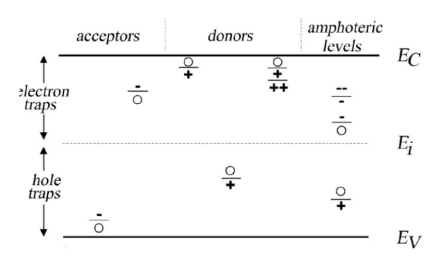
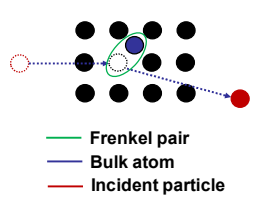
### Detector structure



Rouvié, Anne, et al. "InGaAs focal plane array developments at III-V Lab." *Infrared Technology and Applications XXXVIII*. Vol. 8353. International Society for Optics and Photonics, 2012.

## Proton irradiation results

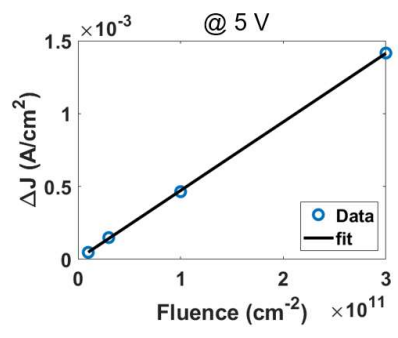
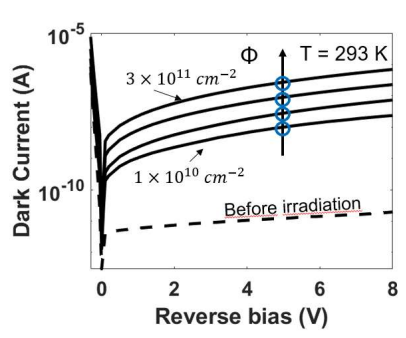
### Proton-induced defects



Enhanced carrier generation !

Moll, Michael. "Radiation damage in silicon particle detectors. Microscopic defects and macroscopic properties." (1999).

### Proton-induced dark current degradation



$$\Delta J = \alpha(V) \times \Phi$$

$\alpha$  : Current-related damage rate  
 $\Phi$  : Fluence



## Perspectives

- What does  $\alpha$  depend on?

$$\Delta J = [qW \times K(\dots)] \times \langle \Gamma \rangle \times NIEL \times \Phi$$

