



JC2 JOURNÉES CNES JEUNES CHERCHEURS



12, 13 ET 14 OCTOBRE 2022

CITÉ DE L'ESPACE

Space Radiation Effects on Single Photon Avalanche Diodes (SPADs)

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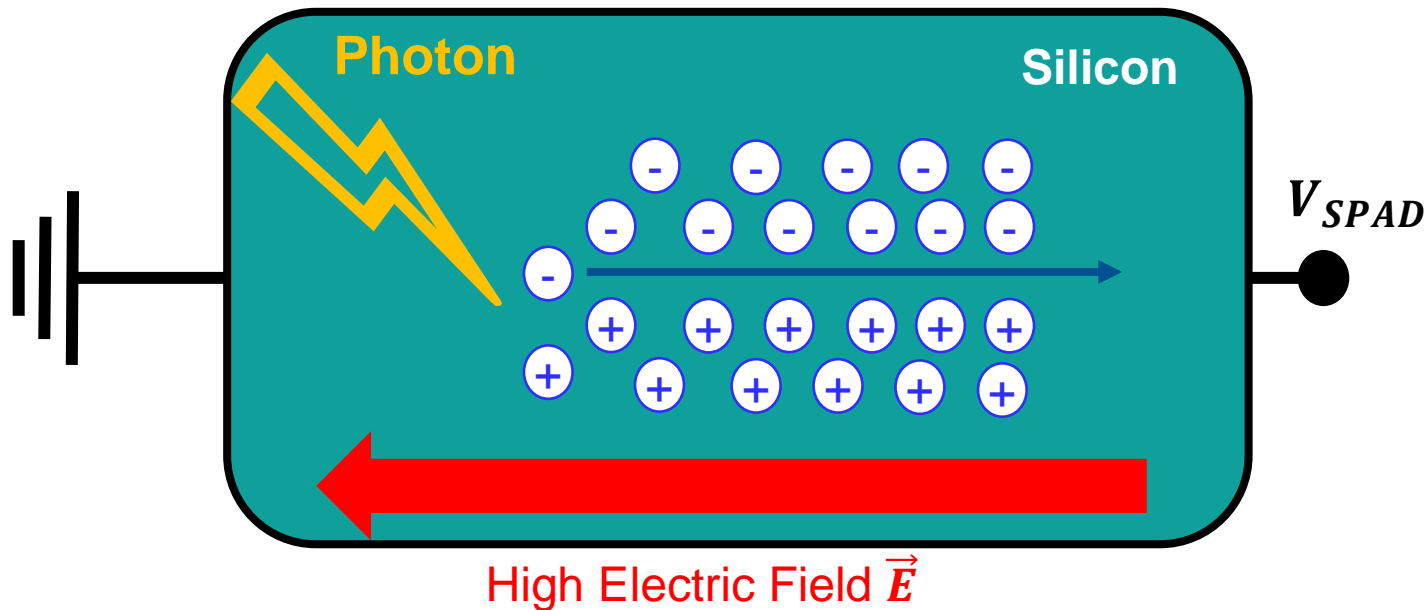
Valérian LALUCAA/Cédric VIRMONTOIS (CNES)

Space Radiation Effects on Single Photon Avalanche Diodes (SPADs)

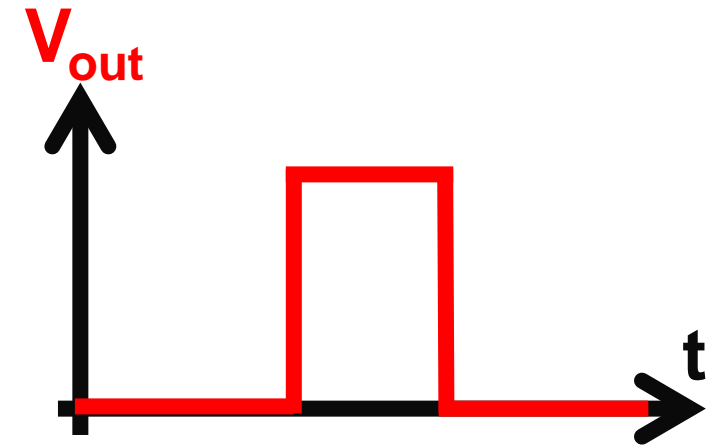
SPAD: Single Photon Avalanche Diode... ???

- ❑ Photodiode sensitive **to one photon**

Electronic avalanche



One avalanche = one pulse



Space Radiation Effects on Single Photon Avalanche Diodes (SPADs) Applications



Astronomy



Space Rendezvous



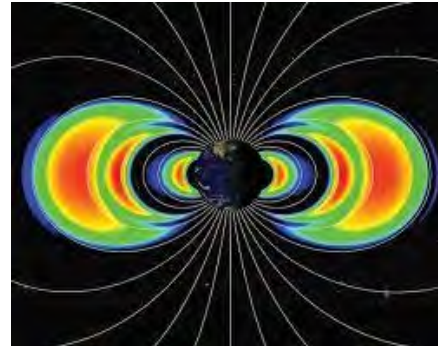
LiDAR

Space Radiation

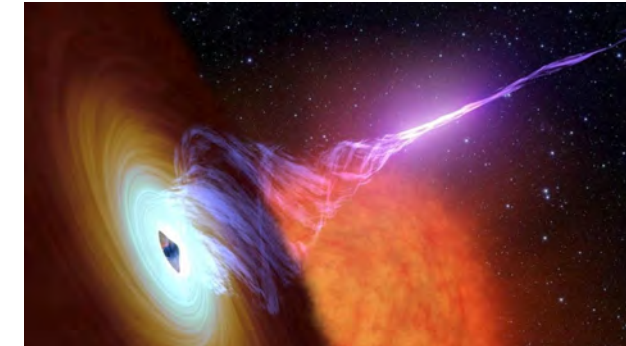
- ❑ **Photons: rayons X, rayons γ**
- ❑ **Particles: electrons, protons, neutrons, heavy ions**



Solar Events

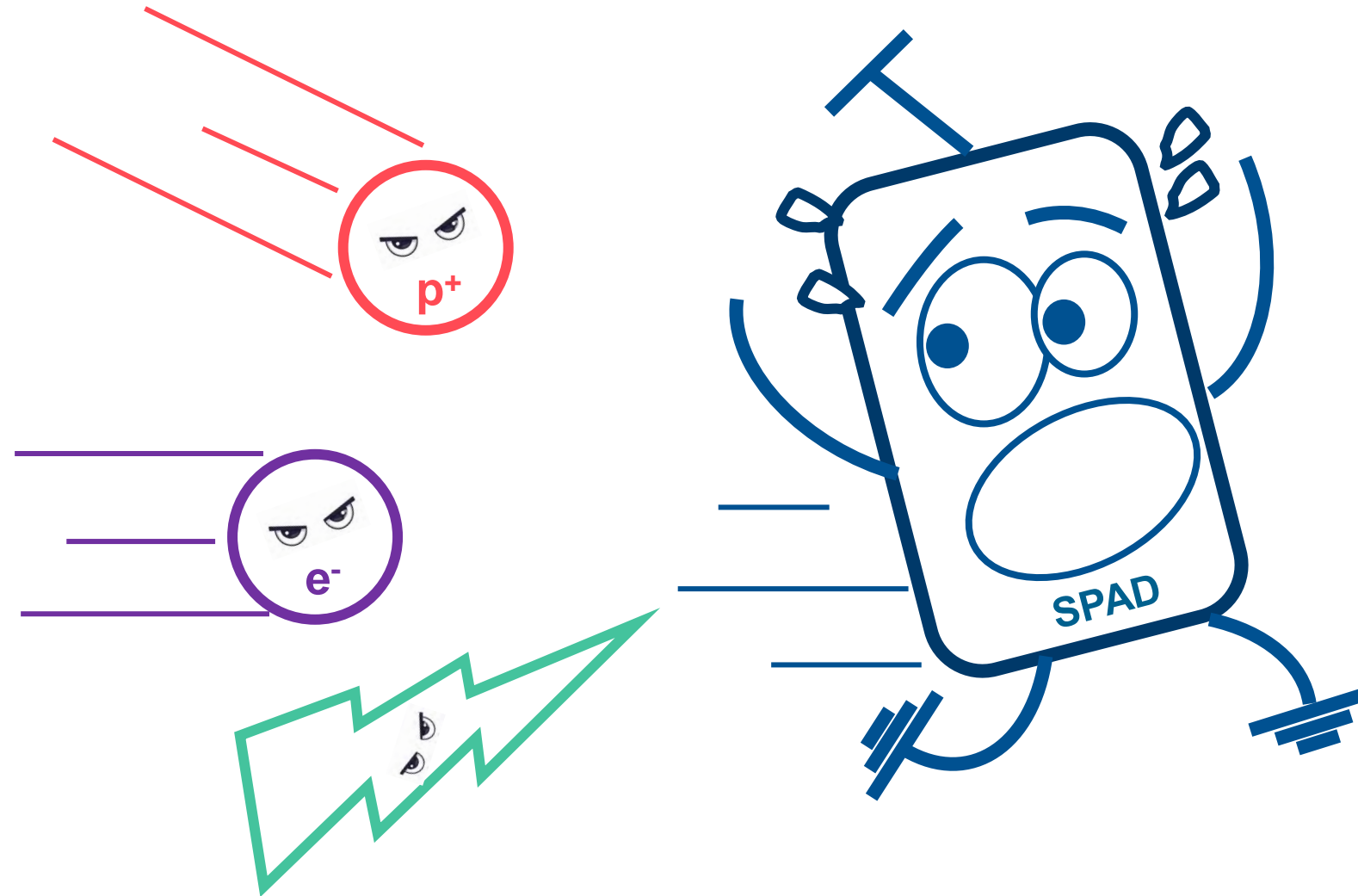


Trapped Particles

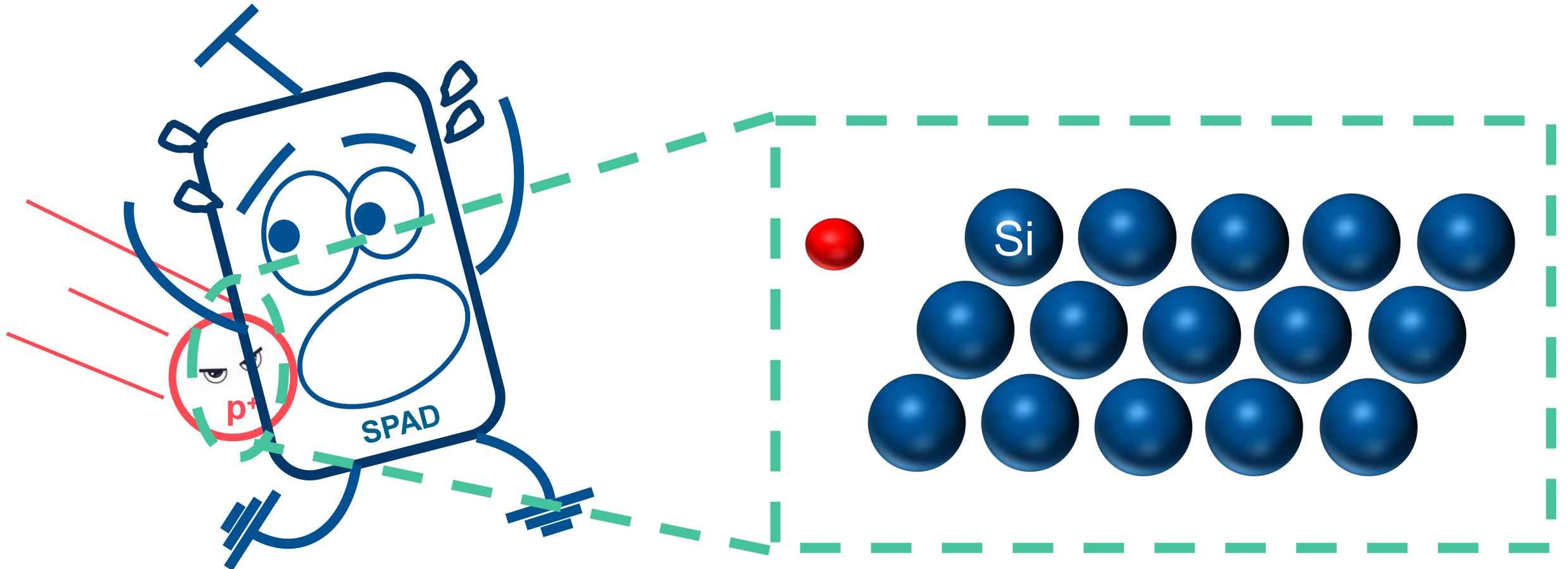


Galactic Cosmic Rays

How SPADs withstand this harsh environment ?



One Radiation Effect: Displacement Damage



Proton Irradiations: Degradation of Dark Current (= number of pulses detected without light)

