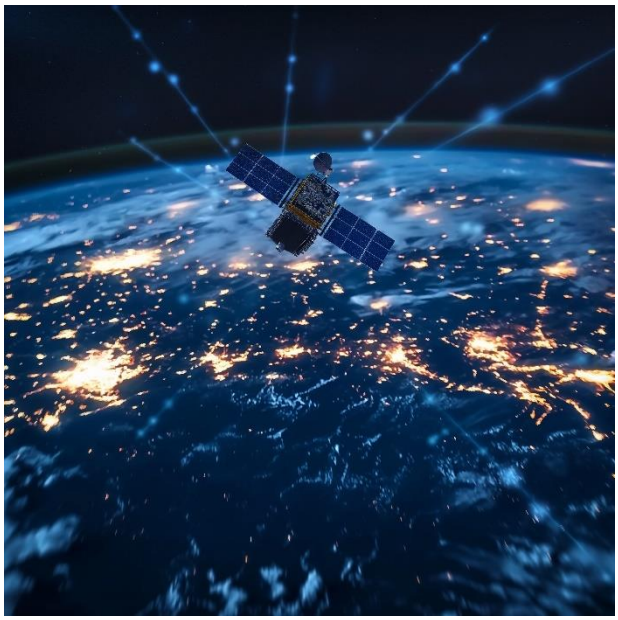
Semester Project:
Low noise APD for optical space communication

The Big Picture



Free-space Optical **(**FSO) links transmit information from point-to-point using a narrow beam of light. This type of networks is becoming more widespread because they offer high bandwidth, low latency, enable improved security through quantum key distribution and allow rapid network access in difficult-to-reach areas.

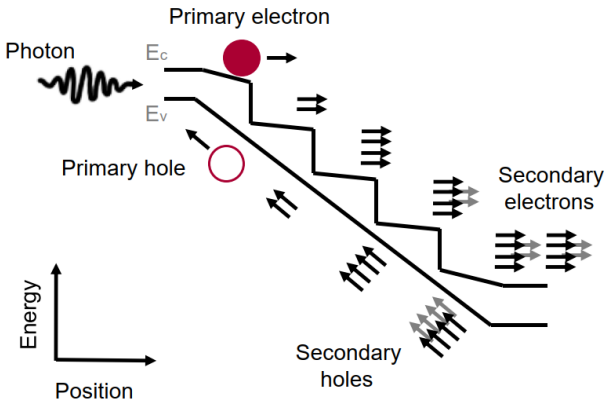
Avalanche photodiodes (APDs) are a key technology in this field, enabling higher sensitivity receivers for optical space communications at 1550 nm.

Thesis Description

Traditionally, APD characteristics are analysed using either analytical models or semi-classical Monte Carlo algorithms. To better understand APD behaviour and improve performance, an *ab initio* quantum transport approach is needed, incorporating electron-electron and electron-photon interactions, especially under high-field conditions.

This project aims to simulate the InGaAs APD multiplication process with a focus on noise performance, using density functional theory and Non-equilibrium Green's Function (NEGF) formalism. Albis will support the simulation with technical expertise and measurement data from its APD products.

Your Gain



Staircase APD energy band diagram.

- Better understanding of semiconductor device physics and simulation process.
- Improvement of your programming skills.
- Albis company visit with factory tour.

About Albis Optoelectronics

Albis Optoelectronics is a leading designer, developer and manufacturer of high-speed photodiode chips. The company offers a diversified product portfolio consisting of InP and GaAs based PIN photodiodes, APDs and high-speed detector modules up to 60 GHz. These photodiode products are completely manufactured in-house in fully owned clean-room facilities located in Rüschlikon.

Contact

Looking for 1 Semester student;

Interested candidates please contact:
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