

NANO, THE FUTURE OF TECHNOLOGY?

A deeper look on Nano-photodetectors.

Photodetectors are like the transmission of a formula one car; they are not as fancy as the aerodynamics design, or not as famous as the engine, but they are crucial for the car performance. So, what are photodetectors and why should we care about them? This are devices capable to detect electromagnetic radiation and convert it into an electric signal. What make them interesting and useful is that we are capable to make them detect a specific radiation, like infrared light for example, so their applications can range from simple devices that automatically open supermarket doors and receivers on TV remote controls, to photodiodes in fiberoptic connections or in Integrated Circuits, which are present in virtually all electronic equipment that we use today.

Modern technology is pursuing the challenge to do smaller, lighter and more efficient components, and nanotechnology is proving to be the way to do it. When we talk about nanodevices, we have to think about how the size of a typical nanoparticle is to that formula one car as the car is to the Earth, and at that size things do not work the way we are used to; it is the territory of Quantum physics, and materials present a whole new set of characteristics that we can use to improve our technology. In the case of photodetectors, it is theoretically possible that nanowire arrays reach 100% light absorption. This could make the creation of 100% efficient solar panels possible (the actual performance of a solar cell is around 30%).

However, in order to reach all these applications and improve the present technology, a better knowledge of the behavior of these nanowire-based devices has to be reached. This will be the aim of this thesis: we are going to characterize a specific configuration for an indium phosphide nanowire-based photodetector. By determining its behavior under different voltages and temperatures and comparing two different configurations, we want to reach a basic knowledge of this devices, which will set a starting point on the pursue of a more efficient photodetector design.