“Performances of 1D, 2D and 3D sensors”

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Position Sensitive Detectors (PSD) are optical devices that have the capability to detect the spatial position of a light beam, typically a laser. If the sensor is built in a strip configuration, it detects the position of the beam in the dimension of the strip and so it is called 1D sensor. The 2D sensor is built with an active area, like a square, and it can detect the position of the light beam in the two dimensions that describe the area of the sensor. On the other hand, the 3D sensor has a more complex structure, since it consists of an array of several 1D sensors working in parallel. But, instead of detecting just the position of a light bean in one dimension, the sensor detects the shape of a laser line shining on the sensor. It is this advantage over the other configurations that qualifies this type of sensor as 3D, since the integration in time of a laser line reflecting upon a rotating object will allow the reconstruction of the three-dimensional object. Three dimensional PSD have been studied as a valuable cost effective alternative to CCD devices, for applications requiring less resolution, but needing better sensitivity and faster response time, for real time monitoring.

The most qualified material to work the sensitive element is the silicon. But, regardless the fact that the actual commercial PSD are being fabricated using crystalline silicon technology, the high costs of this technology and drawbacks in flexibility makes of the amorphous silicon technology a more reliable and versatile substitute.

The presentation will focus on the functioning mechanism of the several PSD devices based in the amorphous silicon thin film technology, their different structure configurations, characteristics and performances.