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# Quantum well Structures for multi band photon detection

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Quantum well (QW) structures are planar objects in which electrons are confined in one dimension. Compound semiconductors can be used to fabricate QWs with several combinations of barrier and well materials, allowing for a tuning of the electron band gap down to 0.8 eV. Preliminary experiments carried out on such an InGaAs / InAlAs QW indicate that these devices are very valuable in multi band photon detection. In addition and depending on the external circuitry internal charge amplification mechanism can be applied for very low signal levels. Moreover, the high mobility of the charge carries allows the design of very fast photon detectors with response times in the pico second range and below.

In this contribution we present primary results obtained with a segmented QW detector that allowed monitoring simultaneously the intensity and the position of pulsed or continuous photon beams over an extended spectral range. Two versions of the read-out electronics have been applied: charge integration with 1 ms frame rate and 20 bit dynamics and a system based on wide bandwidth (5GHz) radiofrequency electronics chain, able to analyze fast photon pulses. For both readout schemes, position encoding is obtained by the centroid method. Although the primary application of the QWDs are envisaged in the field of free electron lasers and ultra bright synchrotron light sources the devices could be used in combination with table-top lasers and be exploited in other fields of photonics.

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