

# QUANTUM DOSIMETRY

## AREA OF EXPERTISE

- Detectors & Instrumentation

## IP STATUS

- Technology jointly owned by CERN and Czech Technical University. PCT application filed in 2007.
- Prototypes of the Quantum Dosimeter have been built and testing of the invention is being done in the LHC tunnel.
- Licenses and know-how on the Quantum Dosimetry can be offered.

## CONTACT PERSON

aurelie.pezous@cern.ch

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[kt.cern](http://kt.cern)

*Quantum Dosimetry is a novel invention comprising a method, software and apparatus to determine dose, dose rate and composition of radiation. The Quantum Dosimeter can identify and categorise the individual radiation quanta by recognising the patterns of the particles detected using a silicon pixel detector such as Medipix or Timepix. The method allows separation of different constituents of radiation, such as electrons, photons, alpha particles, neutrons, ions, muons, and others. It can also determine an energy estimate of the total deposited energy for each of the detected radiation quanta and then compute the contribution of each radiation category to the total effective radiation dose. The invention was made in the framework of the Medipix2 Collaboration. The technology is being used for measuring radiation in the ATLAS cavern.*

## APPLICATIONS

- Market segments are those where combined information from dose, type of particles, and biological effect are of interest. The market for normal dosimeters focuses on key radiation, such as gamma and beta, but might be interested in the Quantum Dosimeter if its properties and cost are competitive. Therefore, the technology can find its applications in the following areas:
  - Healthcare.
  - Homeland security.
  - High-Energy Physics.
  - Real-time active dosimeter for Space.
  - Cost attractive alternative to Germanium detectors.

## ADVANTAGES

- The Quantum Dosimeter gives the dose, dose rate and the real biological effect of radiation with a very high accuracy, in real time.
- It can detect radiation from one or more of the following categories: photons, beta-particles, alpha-particles, delta-particles, protons, minimum ionising energetic ions, fission fragments and neutrons.
- It detects every quantum of radiation, which means it has the best possible sensitivity.
- When integrated with a Medipix chip it offers a small and lightweight device, such as the size of a USB memory stick.
- Such a device will have low power consumption and could be battery powered.

