

Estimated minimum requirements for High-Level Dosimeters of the LHC

LHC - accelerator

Injection lines (5 km) + warm sections of the LHC (estimated 4 km)

Between 1500 and 2000 places to be monitored

Dosimeter type: Radio-Photo-Luminescence (RPL) or Alanine dosimeters

LHC - experiments

Requirements need to be posted by the
experiments

Progress in HLD since December 2004

Alanine dosimeters

Prototype of new dosimeters were manufactured and successfully tested

Next step

Mass production of new alanine dosimeters (unit price will be below 1 SFr)

Possible future plans

Purchase of a new alanine read-out system (costs ~ 45000 Euro)

RPL read-out system

Two prototypes of a new RPL reader system were tested:

- First prototype focused on an *improved* read-out system in the problematic dose *range between 500 Gy and 2 kGy*. Test with RPL calibration samples proved that this method is successful to overcome this problematic dose range
- Second prototype showed that it is possible to build a RPL reader by usage of an *UV LED* replacing problematic Hg-lamp. A first test with a set of calibration samples was successful.

A hypothetic RPL read-out system based on the two prototypes can cover a dose range between *0.1 Gy and 1 MGy* (no weak area in the range of 500 to 2000 Gy).

Next step

Build of prototype using laser pulse excitation of the RPL → we assume that this will lower the sensitivity down to the uGy range!

RPL dosimeters

Purchase of new dosimeters

Negotiations with producer to manufacture dosimeters for a unit price of 1 US Dollar

Next step → ask for samples to test properties of these dosimeters

Procedure of annealing RPL dosimeters for reuse

We started project to test annealing procedure for RPL dosimeters