

# Visit Activities Summary

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## Plans before visit

- FPGA radiation tests in Linac II tunnel.
- CCD and CMOS cameras radiation tests in Linac II tunnel.

## Realisation

- Last preparations for FPGA radiation tests in Linac II tunnel - problems with JTAG programming using LVDS signals. Because of long cables, which connect the FPGA test board with PC computer, there must be special standard use. In this experiment the choice is to use LVDS signals. Proper electronic chips had to be ordered from Texas Instrument company and special boards (coding TTL-3.3V to LVDS and decoding LVDS to TTL-3.3V) had to be developed.
- Putting FPGA board in Linac II tunnel and PC computer (running appropriate software) in Linac II Modulator Hall and starting FPGA memory configuration test (described in the other report).
- Starting to archive data from mstwww server:
  - Linac II beam energy
  - PIA beam current

This data is in text format and contains informations mentioned before measured every 1 minute.

- Cooperation with Mr Bhaskar Mukherje:
  - Idea of measuring lightness of LED diodes as a function of neutron radiation and blackening of optical fibre as a function of gamma radiation. This will allow to develop reliable device for monitoring Neutron and Gamma Equivalent Dose.

- Developing of measurement system for LED diodes. This system (described more in separate report) consists of photometer and power supply and allows to measure the characteristics of LED diodes lightness.
  - First tests of LED diodes in Linac II tunnel. Described in the other paper and shown on meeting on 29th August.
  - Plans of measuring system for optical fibre - waiting for components. This system will utilize photometer, power supply and blue-LED light source and allow to measure blackening of optical fibre as a response to gamma radiation.
- Little support for ELHEP DOOCS group.

## Future plans

- FPGA logic layer radiation tests, depending on configuration layer tests. To look for dynamic SEUs, which didn't change functionality of FPGA.
- Experiments on other electronic components on the FPGA board. Irradiation tests of DDR memory, PROM memory, other electronic elements. The goal of this experiments is to get known sensivity of whole electronic systems on radiation.
- Measuring of FPGA board work in different places with different radiation levels. To change radiation level and total dose the FPGA will be moved inside accelerator tunnel. It shows FPGA chip and whole electronic system behaviour in different radiation environment. Every test done before will be performed.
- Discovering proper shielding for FPGA working in radiation environment (for future use in TESLA experiment). Aim is to get known the difference between gamma and neutron radiation influence on FPGA chip.
- Irradiation tests with other chips. There will be possibility to test different FPGA chips from Xilinx and Altera. For example: Altera Stratix.
- Irradiation tests of CCD and CMOS cameras. Measure radiation influence on working and lifetime of different technology of cameras. Online measurements will show dead pixels, which are caused by working in radiation environment.
- Calibration of LED diodes and optical fibre in CERN and DESY - Zeuthen laboratories. It will help to get influences of neutron radiation on lightness of LED diodes and gamma radiation on blackening of optical fibre.
- Finishing LED diodes tests and new type of TLDs. Tests of LED diodes and TLDs placed in various positions in accelerator tunnel. After calibration it will be possible to know neutron radiation level.

- Performing tests of optical fibre. Measure influence of gamma radiation on blackening of optical fibre, placed in many positions in accelerator tunnel. After calibration it will be possible to know gamma radiation level.
- Preparing the same test systems for TESLA tunnel. FPGA irradiation tests, the same as for Linac II. Developing system for measuring neutron and gamma radiation depended on LED diodes and optical fibre. Tests of prototype electronic devices designed for TESLA experiment.