

## Radiation Tolerance Tests for SFP+ Transceivers

The results are presented for the gamma and neutron irradiation tests for SFP+ transceivers. The radiation tolerance of the electronics components used in the detector area is a key of the electronics systems at the LHC experiments. For example, the total ionising dose and the 1-MeV neutron equivalent flux estimated for the frontend electronics of the thin gap chamber of the ATLAS experiment are 14 Gy and  $4 \times 10^{11} \text{ cm}^{-2}$  for an integrated luminosity of  $4000 \text{ fb}^{-1}$ . We tested several types of SFP+ transceivers from Broadcom and Finisar. Gamma ray was irradiated up to  $O(100)$  Gy at the Cobalt-60 facility of Nagoya University. Neutrons were irradiated up to  $O(10^{12}) \text{ cm}^{-2}$  using the tandem accelerator at Kobe University. The results can be referred to in designing the systems and selecting the SFP+ transceivers for the upgrades of the LHC experiments.

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