EKLM ELECTRONICS RADIATION HARDNESS TEST

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Belle II Trigger and DAQ Workshop

University of Hawaii at Manoa

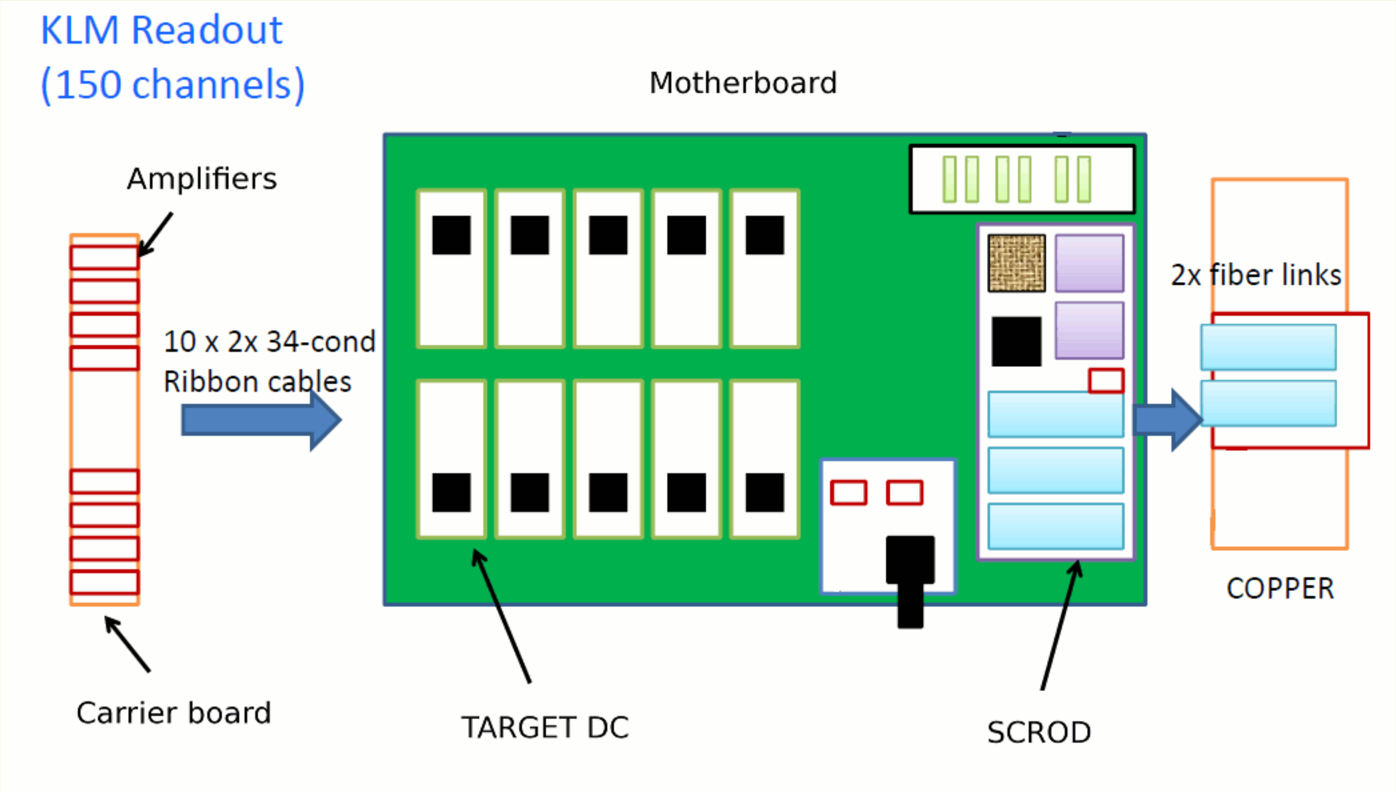
January 16, 2012

Electronics layout

Amplifiers and carrier board are installed inside detector;

No maintenance is planned;

Amplifiers should survive ~ 15 years of Belle II operation.



Test details

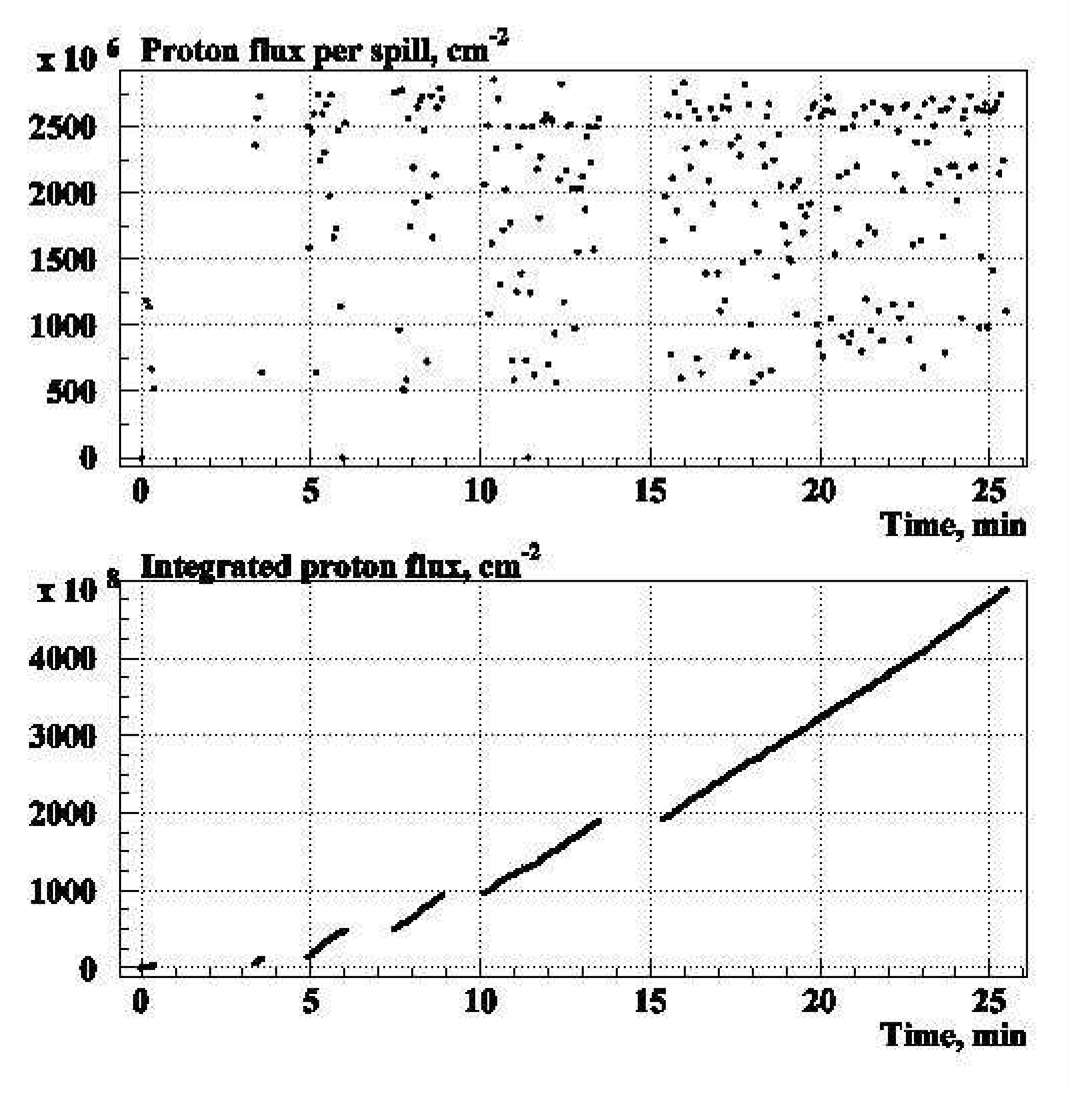
12 amplifiers and the carrier board were irradiated in ITEP with 200 MeV protons.

100% corresponds to 10^{11} protons/cm^2, which is equal to 15 years of Belle II operation.

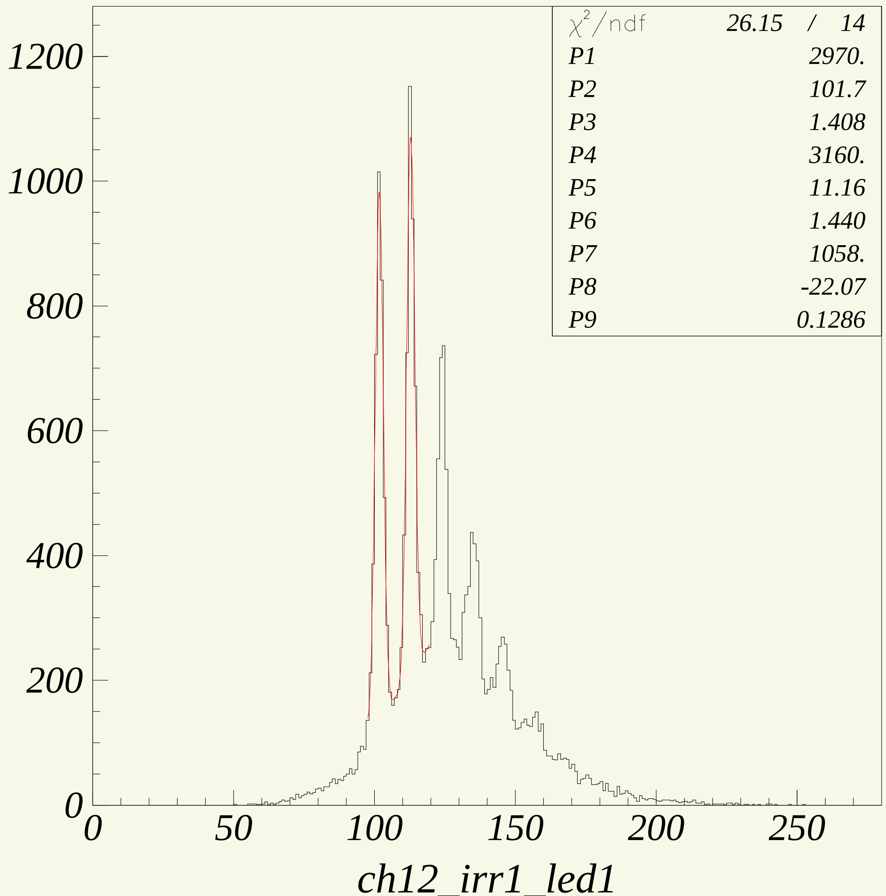
4 groups:
50%, 100%, 200%, 500%.

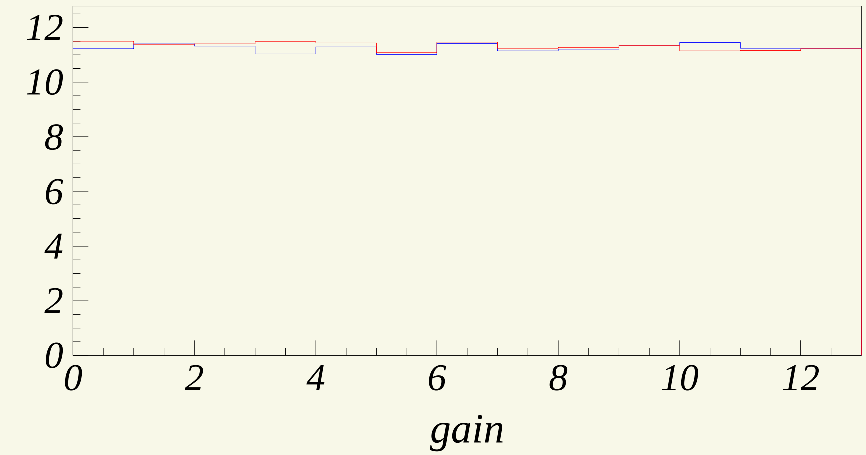
Carrier board was irradiated to the maximum dose.

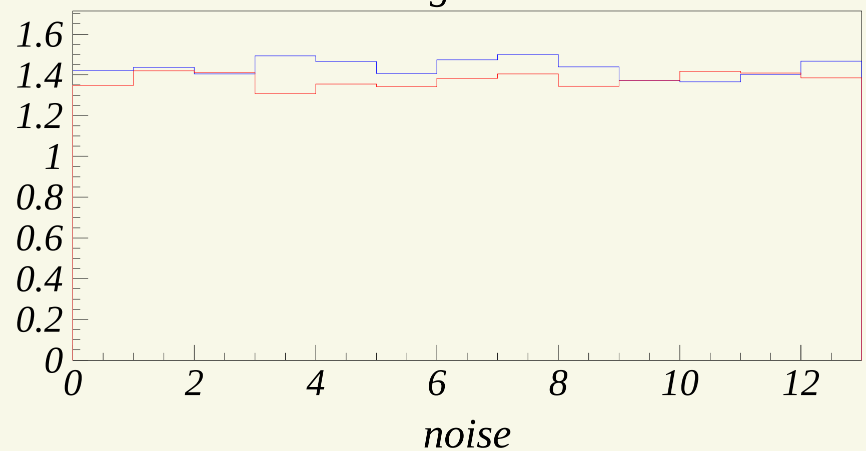
The same SiPM was used before and after irradiation.



Test results







Typical spectrum.

Pedestal width = noise,
distance to the first p.e. = amplifier gain.

First bin – not irradiated,
the rest in order of dose increase.

Blue – before irradiation,
Red – after irradiation.