

SiPM based Neutron monitors for CMS experiment

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Monitoring of neutron radiation field is an important task for the CMS experiment at CERN.

neutron background affects electronics situated in the experimental cavern inducing single event effect (SEU, SEL etc).

In addition, neutron flux is a main source of the background for the muon chambers, so it affects both performance and longevity of the detectors,

especially for high luminosity operation.

The existing shielding of the beam pipe may have some imperfections due to mechanical constraints and necessity of the maintenance of beam pipe itself and associated equipment.

So we need a distributed system of neutron monitors around the shielding and in proximity of the detector/electronics components.

The neutron monitors detectors should be insensitive to fringe magnetic field (up to 1000Gs) and should effectively discriminate neutrons from ionizing radiation.

SiPM based detector could be considered as good candidate for monitoring of CMS neutron background. Several types of SiPMs coupled to neutron sensitive scintillators were

developed, produced, calibrated and tested in CMS cavern at several levels of luminosity. Experimental results are presented and discussed.

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