

SiPMs for real-time X-ray beam monitoring in transmission mode

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Improving the accuracy of real-time dosimetry of intense X-ray beams at research or medical facilities requires the application of thin and compact detectors operated in transmission mode for online monitoring of the beam intensity and spatial profile.

In this context, we report on our activities to investigate the feasibility to detect high-intensity X-ray fluxes using Silicon Photomultipliers (SiPMs) exposed directly to the X-ray beam with no passive converter, which represents an unconventional and novel application for these sensors.

We have exposed SiPMs with different dimensions and microcell sizes to steady fluxes of X-rays. Our campaign of laboratory measurements and tests shows that the online readout of the DC current from the SiPM is a candidate observable that could be parametrized and calibrated to achieve a percent-accuracy long term monitoring of the beam intensity. The details and the results of the measurements, the SiPM response parametrization and the prospects for possible applications and follow-up studies will be discussed in this contribution.

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