

SPD Very Front End Electronics

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The SPD (Scintillator Pad Detector) is a part of LHCb calorimetry. Its function is to discriminate between charged particles and neutrals for the LHCb level0 trigger. This detector uses scintillator pad readout by wavelength shifting (WLS) fibbers that are coupled to MAPMT via clear plastic fibbers. The specific features of the SPD detector are the high granularity in the inner part of the detector, and the use of 64-channel photomultiplier tubes with small pixel dimension. The choice of a MAPMT allowed to design a fast, multi-channel pad detector with a reduced cost per channel..

The signal outing the SPD PMTs has large fluctuations in the signal pulse shape since the average of photoelectrons is only about 20-30 due to the response of the WLS fibre, which has low decay time. This fact causes another bothering trouble: the potential tail of a high amplitude event could cross the threshold and provoke a fake trigger. Thus, pile-up correction is needed.

SPD Readout system is performed by an specific ASIC which integrates the signal, makes the pile-up compensation, and compares the level obtained to a programmable threshold (distinguish electrons and photons), an FPGA which programmes the ASIC threshold and pile-up subtraction and finally LVDS serializers, in order to send information to the first level trigger system.

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