

RWTH Technology

Impedance Matching for Photomultiplier Tubes

RWTH Innovation GmbH

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Field of application

Electronic devices

Keywords

#Photomultiplier;
#impedance matching;
#low signal loss;
#custom electronics

Contact

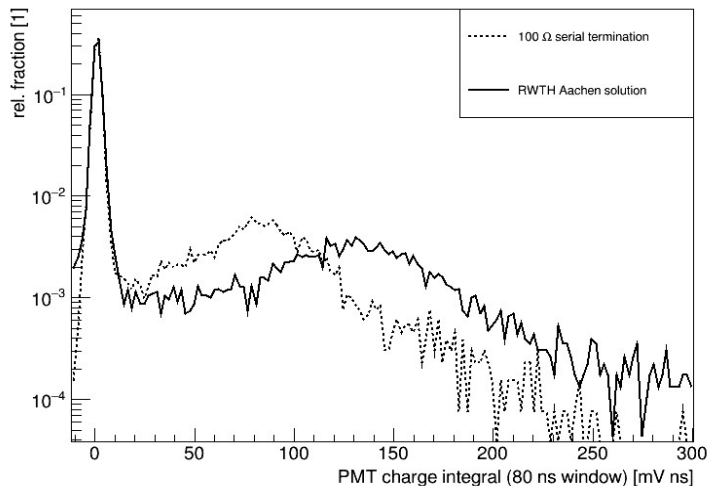
RWTH Innovation
Campus-Boulevard 57
52074 Aachen
GERMANY

Tel.: +49 241 80-96610

info@rwth-innovation.de

www.rwth-innovation.de

Comparison of digitised charge



Challenge

Photomultiplier tubes (PMT) have a given output impedance, which is defined by the internal geometrical structure. On the other hand, every electronics, which is used to process the signals of the PMT has an input impedance. Due to the impedance mismatch part of the signal gets reflected back into the PMT and hence is lost. A very simple approach to match the input to the output impedance is a resistor, but also in this case part of the signal gets lost in the resistor.

Solution

Our solution minimizes the signal loss by matching the output impedance to the input impedance in an advanced way. By this it is possible to minimize the signal loss. At the same time the impact on the signal timing is minimal.

With this solution it is possible to match the PMT output impedance (in the image above 150 Ω) to normal 50 Ω electronics as well as to custom electronics with low (e.g. 3 Ω) impedance.

Advantages

- Impedance Matching of PMT and connected electronics
- Higher charge output, because less signal is lost
- Conserved timing, almost no shaping in output signal
- Possibility to separate PMT ground from other grounds

Status

- German patent application pending
- Proof of concept and prototype

RWTH Aachen University is looking for partners for patent exploitation and for research partners for joint development and contract research.