

Development of an analog read-out channel for time projection chambers

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The development of an analog read-out channel for time projection chambers (TPC) is presented both in schematic and layout. Structure of the channel consists of a preamplifier, fourth order shaper and differential buffer. It also includes pole-zero cancellation circuit. The channel operates with positive and negative polarities of input charge and has a single-ended input and differential output. The prototype has the following features: dynamic range of 100 fC for both polarities, 20 mV/fC of sensitivity for differential output, peaking time – 160 ns, ENC - <1000e at 40 pF of source capacitance. The presented channel was designed and verified in the CMOS UMC MMRF 180 nm process. The results of post layout simulation are presented.

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