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NTIMP1—a Fast Pulse Readout Chip with 1.2V Power Supply for Time-of-Flight Measurement

A very fast pulse readout ASIC, NTIMP1, with 1.2V power supply is presented in this work. It is going to be used as front-end electronics (FEE) for reading out the timing resistive plate chambers (RPCs) in the time of flight (TOF) wall of the compressed baryonic matter (CBM) experiment of the the High Intensity Heavy Ion Accelerator Facility (HIAF), China. NTIMP1 is fabricated using 0.13μm standard CMOS Technology and the eight-channel front-end readout architecture is featured with a high-bandwidth preamplifier dealing with differential current input, a discriminator with adjustable thresholds, and a LVDS module ensuring long-distance signal transmission. The input of NTIMP1 can range from 4 fC to 2048 fC and the input impedance of the preamplifier can be adjusted externally with an off-chip resistor, so as to match with the strip electrode impedance of RPCs. The bandwidth of the preamplifier is 640MHz, which allows a very short signal peaking time of no more than 800ps. The jitter of the leading edge is lower than 10ps suggesting that NTIMP1 is suitable for high-resolution TOT measurement as well as time-slewing correction. Electrical measurement results on NTIMP1 will be shared at 23rd real-time conference.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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