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## **Timepix, a 65k programmable pixel readout chip for arrival time, energy and/or photon counting measurements**

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A novel approach for the readout of a TPC at the future linear collider is to use a CMOS pixel detector combined with some kind of gas gain grid. A first test using the photon counting chip, Medipix2, with GEM or Micromegas demonstrated the feasibility of such an approach. Although this experiment demonstrated that single electrons could be detected the chip did not provide information on the arrival time of the electron in the sensitive gas volume nor did it give any indication of the quantity of charge detected. The Timepix chip will use an external clock up to a 100 MHz as a time reference. In the new chip each pixel can record the particle arrival time with respect to an external shutter using the same 14-bit counter as used in the Medipix2 chip to record the number of particle arrivals during a shutter opening time. Moreover, each pixel can be independently configured in one of 4 different modes: masked mode: pixel is off; Medipix2 mode: 1-count for each signal over threshold, analog mode: the counter is incremented continuously as long as the signal is above threshold; and Timepix mode: the counter is incremented continuously from the time the first hit arrives until the end of the shutter. Each pixel contains a preamplifier, a discriminator with hysteresis and 4 bits of threshold adjustment, synchronization logic and a 14-bit counter with overflow control. The chip resembles very much the Medipix2 chip physically and can be read out using the various existing systems. The presentation will outline the main features of the new design, electrical measurements and a few first images.

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