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Design and simulation of a TDC to 20ps in BiCMOS for application on TOF-PET.

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The measurement of time plays a fundamental role in many physics experiments. The TDC, Time to Digital Converter, is a device that returns a time interval every time there's two input pulses. This device can be applied in many physics experiments because we can convert physical events in pulses so as to measure the time between two pulses. In the data output from the TDC they are presented in binary order to simplify the work in the following processing steps. It can be applied in many fields where it is required a very accurate temporal resolution, such as for example high-energy physics, military, aerospace and in the medical. The TDC we are planning has a time resolution of 20ps, it uses the SiGe BiCMOS technology 0.13um and it will be used in the medical field in particular in the TOF-PET that leverages the time of flight for the reconstruction of the image.

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