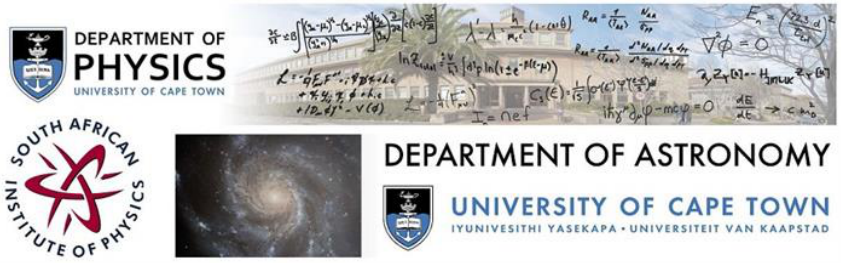

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The design of a cost effective high precision time measurement unit for use in a Hanbury-Brown Twiss interferometer

Wednesday, 6 July 2016 16:10 (1h 50m)

Abstract content
   (Max 300 words)
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Single and entangled photon sources are usually characterized by measuring the first and second order coherence function. The Hanbury-Brown Twiss interferometer is used to measure the second order coherence function. This research will discuss the design of a cost effective high resolution time measurement unit, which will be used to characterize entangled photons generated via four-wave-mixing in Rubidium vapour. This requires the design of a device that will be capable of measuring the time interval between the arrivals of two photons with a resolution of about 1ns. Currently field programmable gate arrays (FPGA) are a popular choice to perform these types of measurements. We review the design methods implemented by FPGAs such as tapped delay lines, the Vernier Method and the use of ISERDES and describe the potential resolution an FPGA can achieve. We report here on the design and construction of a device with similar capabilities using a PIC micro-controller, making use of its capacitive time measurement unit (CTMU) to implement a time-to-amplitude conversion (TAC). The digitized output of the TAC is then relayed to Labview for further processing.

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