

Fast transient recorder for spectroscopy experiments

Thursday, 18 September 2008 16:15 (20 minutes)

Many experiments in physics with high data rates, short analog signal pulses (40ns), fast rising edges and large dynamic ranges require transient recorders with very high resolution. Additionally double pulses can occur on many spectroscopy experiments, like the COMPASS recoil proton detector. These pulses are recorded and separated by numerical digital processes to extract time and amplitude information and used to create a trigger signal.

To meet these challenging requirements the so-called GANDALF transient recorder has been developed with a resolution of 12bit at 1Gsps. Extended with additional memories this module is not only a dead time free readout system but also has huge numerical capabilities provided by the implementation of a Virtex5SXT FPGA to solve challenges for double pulse separation and timing resolution in the sub-nanosecond range.

Summary

Development of a fast transient recorder for spectroscopy experiments with high resolution of 12bit at 1 Gsps and huge numerical capabilities.

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Session Classification: POSTERS SESSION