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FPGA based real-time signal processing for particle-detectors at COSY — ●MATHIS BEYSS for the JEDI-Collaboration — Forschungszentrum Jülich — Rheinisch-Westfälische Technische Hochschule Aachen

Field programmable gate arrays (FPGAs) allow fast signal processing due to high parallelisation while offering highly customizable circuit design; they are nowadays of high importance in many data processing applications. At the COoler SYnchrotron (COSY) at the Forschungszentrum Jülich, hydrogen atom detectors (H0) consisting of two plastic scintillators are used to observe the electron-ion recombination rate during electron cooling of the proton beam. The recombination rate provides valuable information on the alignment of the electron and proton beam. Using FPGAs and a System-on-a-Chip approach a fast data acquisition and processing system of the detector signals will be set up and integrated into the Experimental Physics and Industrial Control System (EPICS). In this work the processing chain from signal discrimination up to coincidence counting of the detected particles and the implementation based on the FPGA development board will be presented.

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