



Joint ICTP-IAEA School on Detector Signal Processing and Machine Learning for Scientific Instrumentation and Reconfigurable Computing

Description:

The school will cover key aspects of detector signal processing and machine learning methods using FPGA-based systems-onchip (SoC-FPGA) for scientific instrumentation and reconfigurable computing, with emphasis on applications in nuclear science and particle physics.

MORE DETAILS:

Modern nuclear and particle physics experiments require online data acquisition (DAQ) systems capable of processing multiple parallel signals from detectors, while reducing both the data rate and the volume of data stored for subsequent offline analysis. These systems typically rely on:

- Advanced digital pulse processing and machine learning methods for event detection and discrimination
- A reconfigurable computing paradigm that integrates the flexibility of software with the high performance of hardware in a single chip

Participants in the school will be introduced to open-source methods, software design tools, and hardware platforms through a combination of tutorials and hands-on lab sessions. They will design and develop embedded instruments using cost-effective detectors and SoC-FPGA devices for applications in nuclear science and particle physics.

TOPICS:



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LOCAL ORGANISER: M. L. Crespo, (ICTP, Italy)

- Detector signal processing and event reconstruction
- Machine learning and model compression for reconfigurable hardware accelerators
- The reconfigurable computing paradigm
- Systems-on-Chip: architecture and design methodology
- Hardware description language (HDL) for FPGA design, modeling, and logic synthesis
- Embedded C and high-level synthesis
- Best practices in firmware and software development
- Digital electronics for standard and modern sensors
- Heterogeneous computing on MPSoC-FPGA



FURTHER INFORMATION:



E-mail: smr4110@ictp.it

Web: http://indico.ictp.it/event/10875/

Female scientists are encouraged to apply.

GRANTS:

A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries. There is no registration fee.

