The Abdus Salam International Centre for Theoretical Physics

IAEA International Atomic Energy Agency

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ICTP 1964–2024

Workshop on Fully Programmable Systems-on-Chip for Scientific Applications

Description:

The workshop will cover key aspects of fully programmable Systems-on-Chip (SoC) and their applications to scientific instrumentation and reconfigurable computing.
SoC is an affordable technology typically used in systems requiring high-parallelism, low-latency, and high-throughput.

MORE DETAILS:

Modern nuclear and particle physics experiments require online data acquisition (DAQ) systems that process multiple parallel signals coming from detectors and reduce both the data rate and the amount of data to be storage in disk for further offline analysis. These systems usually rely on:

- The reconfigurable computing paradigm that combines software's flexibility and hardware's high performance, such as SoC and FPGA.
- Advanced digital pulse processing and machine learning methods for particle detection and discrimination.

Participants will be familiarized with open-source methods, software design tools, and hardware platforms through tutorials and hands-on activities. They will build embedded instruments using low-cost detectors and SoC-FPGA devices.

TOPICS:

- Systems-on-chip: architecture and design methodology
- Good practices in firmware and software development
- SoC-FPGA development framework and remote access
- Digital electronics for standard and modern sensors
- Advanced digital pulse processing methods for detector's signals.
- Machine learning and model compression techniques for reconfigurable hardware accelerators
- Reconfigurable supercomputing architectures based on SoC-FPGA.

27 - 31 October 2024

Doha, Qatar

Deadline:
18 August 2024

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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.

IAEA International Atomic Energy Agency *Atoms for Peace and Development*

IUB Independent University, Bangladesh

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