



## Joint ICTP-TWAS Latin-American Advanced Course on FPGA Design for Scientific Instrumentation

19 November - 7 December 2012  
Havana - CUBA

The Abdus Salam International Centre for Theoretical Physics (ICTP, Italy) and the Academy of Sciences for the Developing World (TWAS, Italy) along with the Center of Applied Technologies and Nuclear Development (CEADEN, Cuba), the University of Informatics Sciences (UCI, Cuba), the Cuban Ministry of Informatics and Communications (MIC) and the Cuban Society of Physics (SCF), will jointly organize a *Latin-American Advanced Course on FPGA Design for Scientific Instrumentation*, to be held in Havana, Cuba, from 19 November to 7 December 2012. The course will count on prestigious lecturers from International Universities, Industry and Research Institutions. Experienced tutors will guide and assist participants during hands-on laboratory sessions.

### PURPOSE OF THE COURSE

This Course is intended as an advanced training activity in Microelectronics, to train physicists, engineers and computer scientists from Latino-American countries to State-of-the-Art design methodologies for prototyping scientific systems, using low-cost reusable Field Programmable Gate Array (FPGA) technologies. Participants will first and foremost be able to leverage their basic knowledge in field-programmable technology, to gain the needed skills for designing and prototyping complete systems in the field of scientific instrumentation. Emphasis is placed on FPGAs in conjunction with a Hardware Description Language, VHDL, as this technology offers cutting edge, yet cost effective, solution for research and training in this field.

The Course will give participants hands-on experience and opportunities for experimentation in this exciting field. Supplying practical know-how on a selection of scientific application examples, this advanced course provides an accessible overview of the use of FPGAs in data acquisition, signal processing, and transmission. It shows how FPGAs are employed in laboratory applications and how they are flexible, low-cost alternatives to commercial systems. It explores a host of applications, ranging from small one-chip laboratory systems to large-scale applications in real world.

The Course first provides a short refresher on FPGA resources, including logic elements, RAM, DSP, embedded microprocessors, and programmable analog resources. It then presents principles and methods for meeting design specifications and ensuring design correctness, such as software/hardware co-design, process sequencing, and intellectual property cores. The remainder of the course addresses examples of applications in high-energy physics and Reconfigurable Virtual Instrumentation (RVI) using the RVI platform developed at ICTP.

It is also expected to stimulate a collaborative Latin American community for the production of software and other FPGA related intellectual property which will enhance the availability of public domain technical resources especially for research and education in developing countries.

### PARTICIPATION

Candidates from Latin American countries that are members of the United Nations, UNESCO or IAEA may apply. As the Course will be conducted in Spanish and English, participants should have an adequate working knowledge of these languages.

As a rule, travel and subsistence expenses of the participants are borne by the home institution. However, limited funds are available for some participants from, and working in, developing countries, to be selected by the organizers. Such financial support is available only for those who attend the entire activity. Every effort should be made by candidates to secure support for their fare (or at least half fare) from their home country. There is no registration fee to attend the Course.

### HOW TO APPLY

The application form can be accessed at the: <http://agenda.ictp.it/smr.php?2384>  
Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the online the application form **not later than 22 July 2012**. Recommendation letters are not mandatory, but may help you in the admission process.

Activity Secretariat: e-mail: [smr2384@ictp.it](mailto:smr2384@ictp.it); phone: +39-040-22409911;

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Course web page: <http://agenda.ictp.it/smr.php?2384>

ICTP Home Page: <http://www.ictp.it>



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### APPLICATION DEADLINE

**22 July 2012**