

Nombre de Tutor del proyecto
Arantza Oyanguren, Luca Fiorini

Datos de contacto del Tutor del proyecto
Arantza.Oyanguren@ific.uv.es
Luca.Fiorini@ific.uv.es

Nombre del Grupo de investigación asociado a AIHUB
A.O. Física Experimental de Altas Energías en Colisionadores
L.F. Grupo de Física del Bosón de Higgs con el Experimento ATLAS del LHC

Ubicación del centro donde se disfrutará la beca
Instituto de Física Corpuscular de Valencia (IFIC)
Parc Científic de la Universitat de València
C/ Catedrático José Beltrán, 2
E-46980 Paterna · Valencia

Título del proyecto:

Development of high-performance reconstruction algorithms in new hardware architectures

Descripción del proyecto (máximo dos párrafos)

This project addresses the need to achieve sustainable computational systems and to develop new Artificial Intelligence applications that cannot be implemented with the current hardware solutions, due to the requirements of high-speed response and power constraints. The student will work on the development and implementation of particle reconstruction algorithms using low-power accelerators (GPUs and FPGAs), as well as on the real-time processing of massive data. This will be crucial for the upgrade of High Energy Physics experiments (such as ATLAS or LHCb at CERN) in view of the High-Luminosity LHC, and for detecting long lived particles, which are predicted in new physics models. In this type of experiments, it is necessary to reconstruct the signals in real time with a minimum latency and with the maximum possible precision. For this reason, algorithms based on Deep Machine Learning will be developed with FPGAs and GPUs. The operation of the developed algorithms will be studied and their performance will be compared with classical methods. The development of these algorithms is interesting also for their industrial and real life applications.

Palabras clave:

- Aprendizaje Automático
- Low power consumption hardware
- FPGA
- GPU
- Física de altas energías