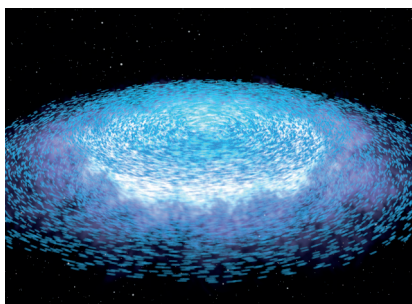


# Understanding the Universe with Supercomputing

University of Coimbra bases its new high-performance computing system on the Intel® Xeon® processor E5 family



UNIVERSIDADE DE COIMBRA

“Our new HPC system, based on the Intel® Xeon® processor E5 family, has given us a huge increase in performance and memory capacity and is enabling us to tackle more complex research problems than ever before.”

*Professor Pedro Alberto  
Coordinator of the Laboratory for Advanced  
Computing of the University of Coimbra*

## Company

Portugal's University of Coimbra was established in 1290. The university's areas of research include high-energy physics, biological systems, astrophysics, quantum chromodynamics (a branch of theoretical physics), chemistry and engineering. Powerful computing facilities are essential for its research.

## Challenge

From the composition of proteins and elements to the structure of galaxies and black holes, scientists at the University of Coimbra and other Portuguese universities are working on furthering our understanding of the universe. What these problems have in common is their complexity, which requires high-performance computing (HPC) facilities for running simulations. The existing HPC system from 2007, which was not based on Intel® technology, was unable to meet today's expectations in terms of the speed and complexity of the simulations it could run.

## Solution

Intel and the University ran a quantum chromodynamics simulation to demonstrate the performance of Intel® processors before the University chose the new HPC system. The University then secured EU funding to establish an HPC system, based on a Fujitsu PRIMERGY CX400\* server with 328 Intel® Xeon® processors E5-2697 v2 product family. It has a total of 3,936 cores; 15,744GB of RAM; and a peak performance of 85 teraFLOPS, with the High-Performance Linpack\* benchmark demonstrating 72 teraFLOPS<sup>1</sup> during acceptance testing. Intel is providing support with optimizing the Lustre\* file system for the architecture. Researchers at the university use the Intel® C and Fortran compilers, and the Intel® Math Kernel Library to develop their simulations.

## Benefits

The new solution enables researchers to not only run simulations faster, but also to tackle more complex problems that were not viable before. Having an increased HPC capability within Portugal will make it easier for the country's researchers and biotech businesses to secure access to HPC facilities and the system will join the PRACE\* network so it can be used by researchers across the EU.

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