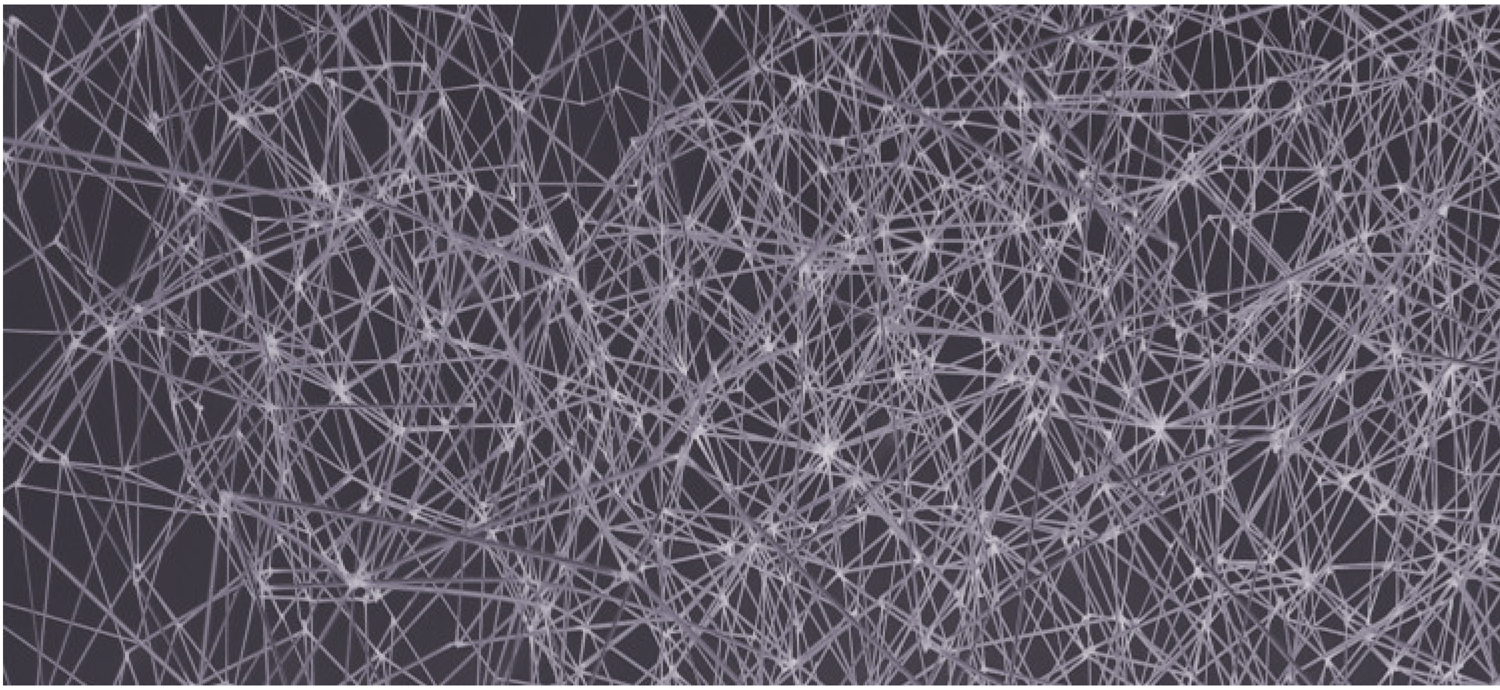
Published on *BSC-CNS* (https://www.bsc.es)

QUANTIC



Quantum computation is becoming a reality. As a discipline combining multiple areas of research, it serves as a novel paradigm of computation and provides at the same time novel tools to understand physical phenomena. It brings novel techniques for solving problems in either a classical or Quantum description.

Around the world, several research laboratories and computer-based companies are developing the first prototypes of quantum computers using diverse physical systems. At this stage of development, Quantum Computation theory moves along the developments and limitations of novel Hardware to better exploit its current capabilities.

Our research focuses on the application of Quantum computers to hard scientific problems. These may be formulated from fundamental principles, or by an affective optimization function. Using novel algorithms we address these problems optimizing resources devoted to their slution. Additionally, we exploit the full power of current classical devices to develop novel simulation tools for Quantum systems in HPC systems.

Objectives

- Develop strategies to exploit small and medium size quantum computers
- Adapt realistic problems with a classical or quantum description to quantum algorithms
- Develop software to control and run a small quantum device
- Use novel classical tools to simulate large Quantum systems