Title: IBISCO (**I**nfrastructure for **BI**g data and **S**cientifing **CO**mputing)

**Source of funding:** Ministero dell'Istruzione dell'Università e della Ricerca

Scientific funding program: National Operative Programme – Research and Innovation 2014-2020

Project coordinator: Gianpaolo Carlino (INFN)

DSFTM & SPIN coordinator: Giovanni Cantele

Other partners: INFN, University of BARI "ALDO MORO", University of Naples "Federico II", CNR-ISASI, CNR-IREA, INAF, INGV.

Project objectives. The IBISCO project aims at carrying out, validating and fully demonstrating, in a real operational environment, a very substantial strengthening of the scientific computing infrastructure in Southern Italy. The main focus will be on big data analysis, high-throughput and high-performance computing, data visualization, image processing and analysis. CNR, and the SPIN Institute in particular, will participate through the acquisition of storage and computing servers, equipped with two multi-core processors per node, novel generation Graphic Processing Units (GPUs), and very high throughput and very low latency networking communication. Designed to satisfy the performance requirements of a very wide class of computing tasks, coming from different disciplines, this part of the infrastructure will be suited to the simulation and modeling of the properties of materials for advanced applications as well as to the development of new software and algorithms in the emerging and rapidly growing field of the quantum computation.
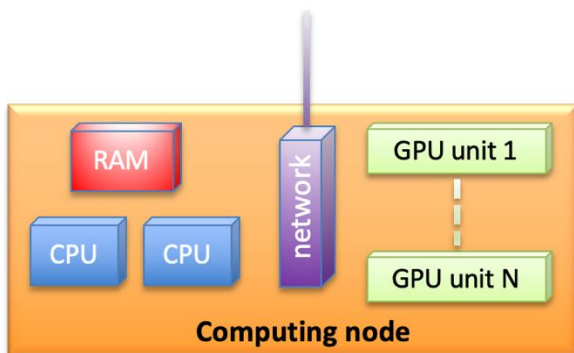
Schematic view of a single computing node, showing the different computing capabilities (CPU, network, GPU)

The CNR-SPIN funding, will be joined to the resources of the CNR-ISASI Institute and will all be part of a larger infrastructure, shared with University of Naples "Federico II" and the INFN, hosting about 32 computing nodes (corresponding to more than 1000 physical cores, 64 GPUs with more than 300000 CUDA® cores and more that 10 Tb of RAM memory). This will certainly match the needs of several SPIN research activities, with the main keywords being modelling and simulation of the properties of advanced and novel functional materials, quantum computation and quantum materials, machine learning approaches and novel algorithms in condensed matter physics and complex systems.

The participation of the three CNR institutes takes place through the CNR Department of Physical Sciences and Technologies of Matter (DSFTM).