MOQUAS

Mon, 2014-03-03 13:55 - admin **Full Name:** Molecular Quantum Spintronics
Coordinator: Marco Affronte (CNR Italy)

Location

CNR NANO INSTITUTE NANOSCIENCE Corso Perrone 24 16152 Genova Italy
44° 25' 26.8356" N, 8° 52' 54.9084" E
Website:
http://www.moquas.eu/

Running time: 2013-10-01 - 2016-09-30

MoQuaS aims at developing devices and protocols to read out and process quantum information using individual molecular spins embedded in electronic circuits. To this end, prototypical hybrid nano-devices addressing single molecular spins will be designed and reliable methods for their realization will be developed. Core of such nano-architectures are magnetic molecules, specifically functionalized to graft electrodes, and exploited as spin (qu)bits. MoQuaS will design and realize the necessary platform for the read out and the manipulation of the electron and nuclear states of single molecules. Besides electromigrated junctions, contact electrodes based on carbon allotropes, including carbon nanotubes and graphene nano-ribbons will be developed. These will allow for interfacing the specially designed magnetic molecule to the outside world with an unprecedented flexibility, beyond what is possible with metallic electrodes.

The resulting hybrid device will function either as molecular spin transistors (three terminal device) or as molecular spin valves by combining carbon based channels with molecular spin filters. The ultimate ambitious goal of MoQuaS is the implementation of quantum gates that will be achieved by using additional strip lines close to our hybrid nano-devices to carry out the spin manipulation. On the way to achieving this goal, a range of challenges will be met by implementing experiments and theoretical descriptions that will ascertain the fundamental mechanisms underlying the functioning of quantum molecular devices. In particular, the key processes of the electron and nuclear spin state preparation, manipulation and read out, spin injection and relaxation will be individually investigated in order to understand the basic mechanisms and then combine the knowledge into prototypes that will set references for a new era in Spintronics in which Quantum information is encoded by Molecular processors.

- EC - FP7
- Other

Source URL: http://qurope.eu/db/projects/moquas