LOW-T LAB @ FIM-CNR

UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

Dipartimento di Scienze Fisiche, Informatiche e Matematiche

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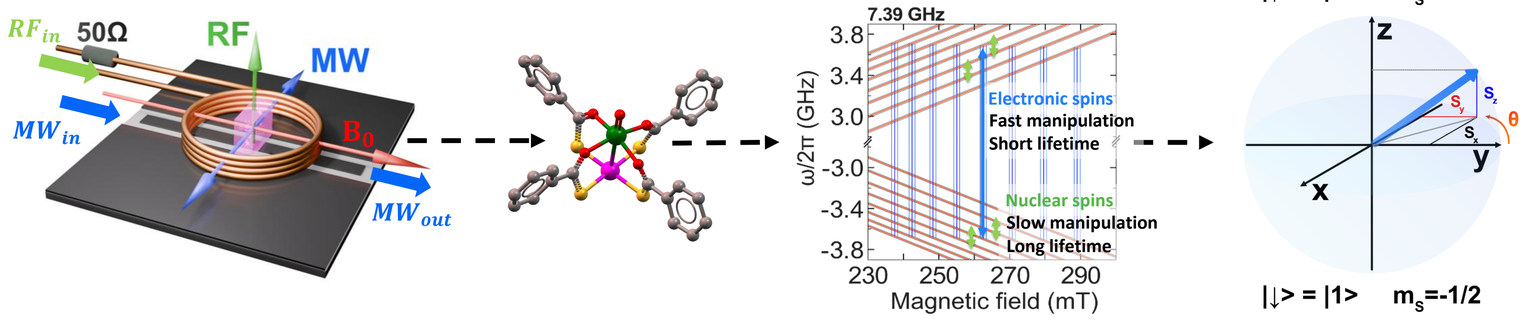
Observing quantum effects in solid-state systems; finding building blocks for quantum computers

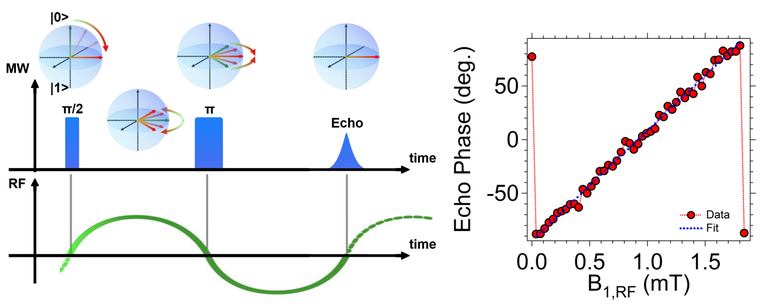
Research Topics

Molecular Spin Qubits

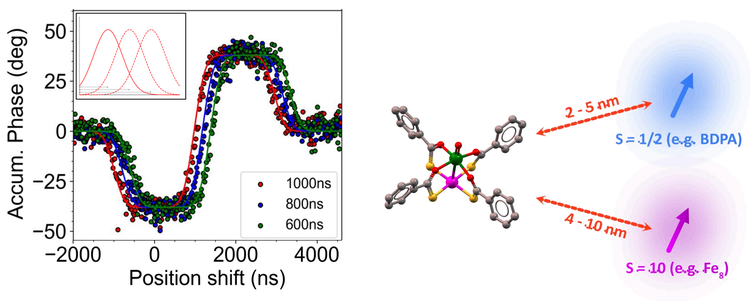


- **Quantum sensing**

Spins for sensing of AC magnetic fields…

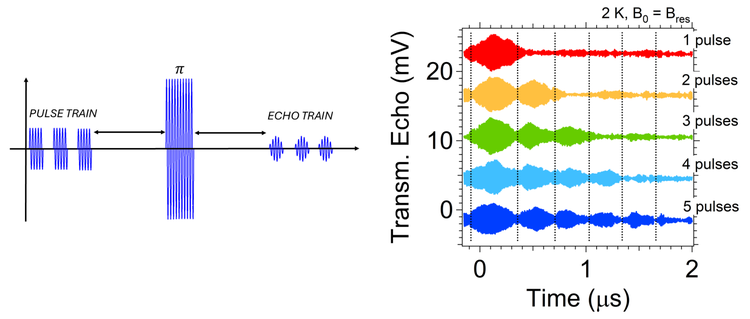


or of time-dependent signals

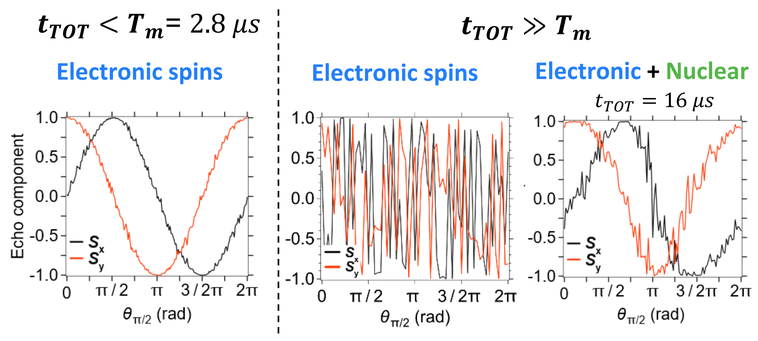


- **Quantum memories**

Encoding information into electronic spins…

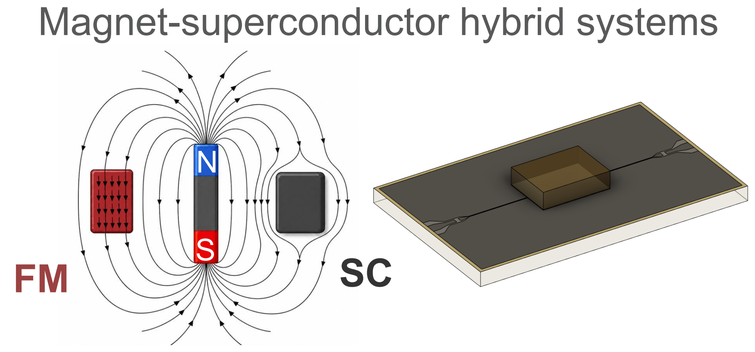


or combining electronic and nuclear spins

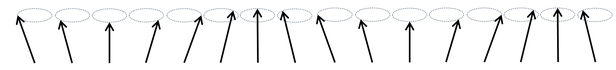


Magnonics & Superconductivity

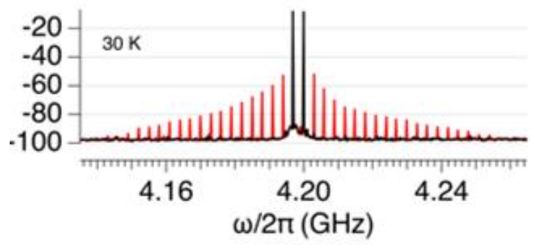
Magnet-superconductor hybrid systems



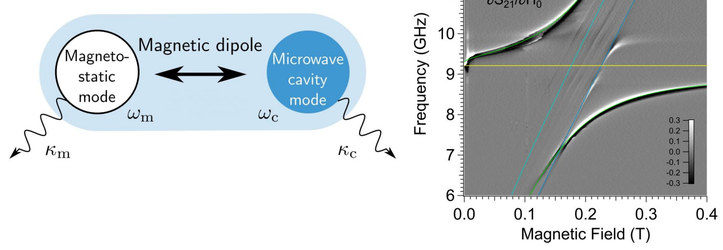
Investigation of spin waves (magnons)



- **Nonlinear effects**: frequency comb

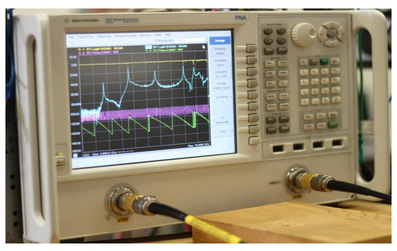


- **Ultrastrong magnon-photon coupling**



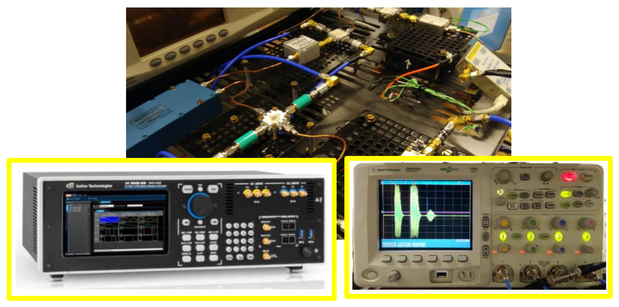
Experimental Techniques

Microwave Spectroscopy

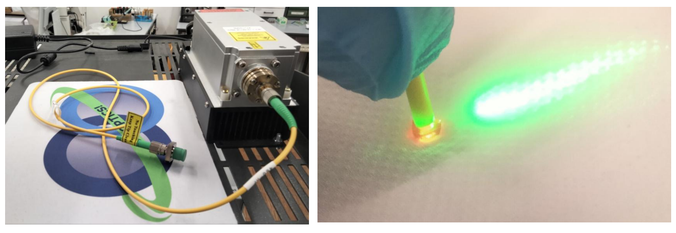


Measuring continuous microwave transmission and reflection

Pulsed spectroscopy (time domain)

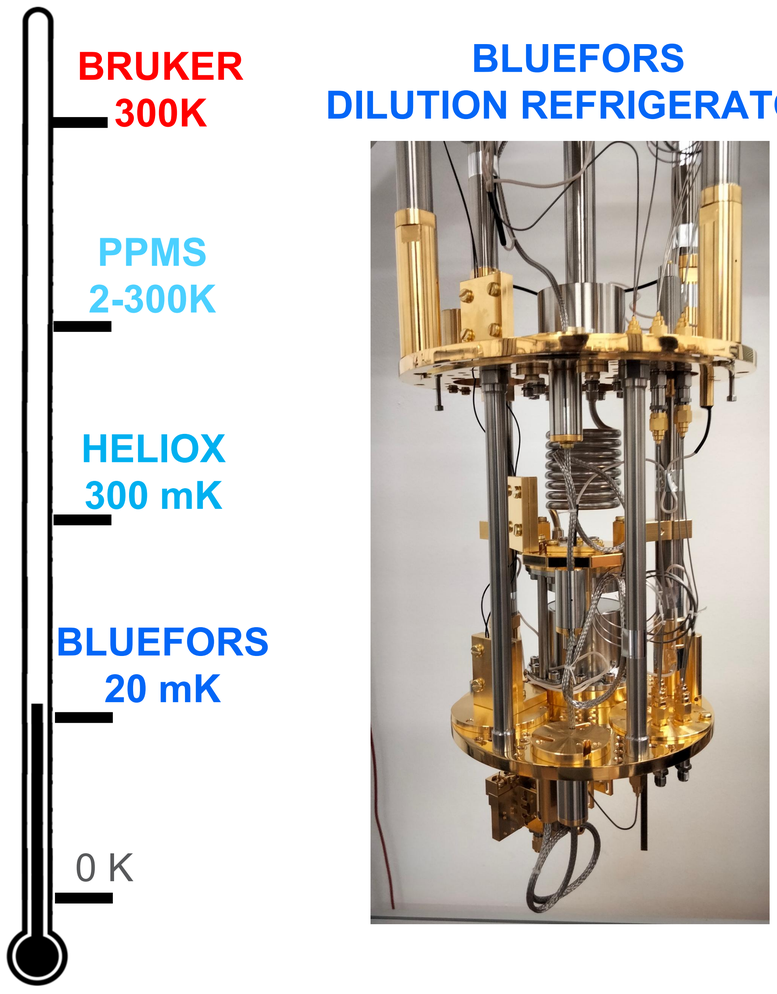


Optical Excitation



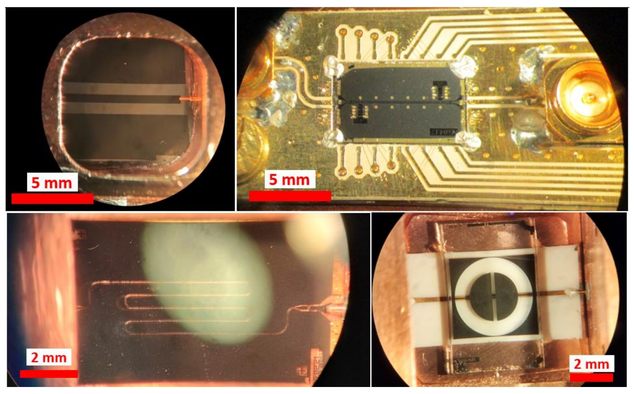
Laser for continuous or pulsed optical excitation (IN DEVELOPMENT…)

Low Temperatures



3 cryostats for cooling samples down to 20 mK, equipped with cryomagnets (up to 9 T); 1 electromagnet (0-1.5T) at 300K

Nanodevices



Design and fabrication of superconducting resonators, graphene-based transistors

Transport measurements



Electrical characterization of nanodevices (down to nano/pico Ampere)

Projects

Finanziato dall'Unione europea NextGenerationEU · Ministero dell'Università e della Ricerca · Italiadomani · NQSTI National Quantum Science and Technology Institute

SMILE-SQUIP: "Addressing molecular and **S**pins with **MI**crowave pu**L**s**E**s through **S**uperconducting circuits for **QU**antum **I**nformation **P**rocessing"

Office of Naval Research · CNR Science & Technology

"Molecular Spin Quantum Technologies and Quantum Algorithms for **QU**antum **I**nformation **P**rocessing"

References

*www.lowtlab.unimore.it

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We are at the physics building of FIM, ground floor, in the corridor after the coffee machines.

Experimental Physics Area FIM-CNR: www.experimental-physics.unimore.it

La ricerca in FISICA