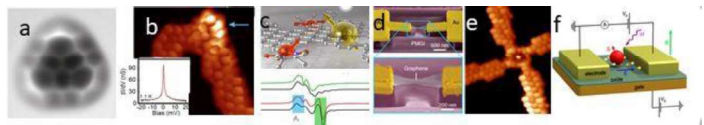


## RESEARCH RESULTS

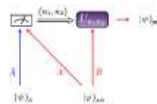


Previous breakthroughs pioneered by SPRING members as scientific basis of graphene quantum spintronics: a) OSS synthesis of the open-shell triangulene; b) Spin localized in graphene junctions; c) Magnetic state in graphene and manipulation by pulsed ESR; d) Quantum interference in graphene junctions; e) Spin survival in a porphyrin contacted by graphene nanoribbons; f) Spin radicals and coupling in transport experiments

In this section, you will find a selection of publications by SPRING consortium partners published in the first year.

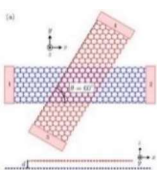
## QUANTUM TRANSPORT

Different modes of encoding and transporting information have been predicted in our consortium.



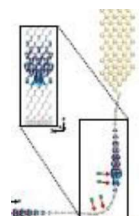
**Teleporting quantum information encoded in fermionic modes**

Tiago Debarba et al. Phys. Rev. A 101, 052326 (2020)



**Crossed graphene nanoribbons as beam splitters and mirrors for electron quantum optics**

Sofia Sanz et al. Phys. Rev. B 102, 035436 (2020)

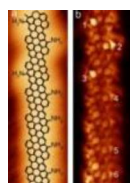


**Magnetism of topological boundary states induced by boron substitution in graphene nanoribbons**

Niklas Friedrich et al. Phys. Rev. Lett. 125, 146801 (2020)

## FABRICATION OF NANOGRAPHENES

Several results contributed to the fabrication of graphene flakes and ribbons with atomic precision using a combination of solution synthesis of organic precursors and chemical reactions over metal substrates.



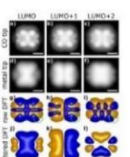
**Band Depopulation of Graphene Nanoribbons Induced by Chemical Gating with Amino Groups**

Jingcheng Li et al. ACS Nano 14,1895 (2020)



**Transferring axial molecular chirality through a sequence of on-surface reactions**

N. Merino-Díez et al. Chem. Sci, 11, 5441 (2020)

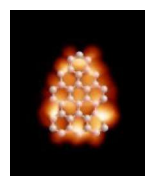


**Intramolecular coupling of terminal alkynes by atom manipulation**

Florian Albrecht et al. Angew. Chemie. Int. Ed. 59, 1 – 6 (2020)

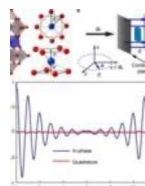
## DETECTION OF SPIN IN GRAPHENE

Spectroscopic fingerprints of spins were detected demonstrating novel properties of pi-paramagnetism.



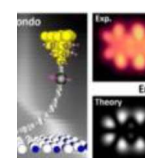
**Uncovering the triplet ground state of triangular graphene nanoflakes engineered with atomic precision on a metal surface**

Jingcheng Li et al. Phys. Rev. Lett. 124, 177201 (2020)



**Quantum coherent spin-electric control in molecular nanomagnets**

Junjie Liu et al. arXiv:2005.01029v1 (2020)



**Probing the Magnetism of Topological End States in 5-Armchair Graphene Nanoribbons**

James Lawrence et al. ACS Nano 14, 4499 (2020)