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Titolo	Tuning the magnetic properties of self-assembled metal-phthalocyanine on intercalated graphene [Tesi di dottorato]
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Sommario	We report on advanced organic spin-interface architectures constituted by metal (manganese, iron, copper) phthalocyanine molecules magnetically coupled with ferromagnetic layer(s), mediated by graphene. The rippled moiré superstructure of graphene/Ir(111), intercalated with a single magnetic layer, drives the assembly of evenly-spaced molecular bits, providing preferential adsorption regions for the phthalocyanine molecules. Our X-ray absorption and photoemission results show that the graphene layer shields the electronic/magnetic state of the molecules, screening the charge transfer/orbital intermixing with the metallic surface. The magnetic response of the molecular spin interfaces and its robustness against thermal fluctuations were investigated by X-ray magnetic circular dichroism. Mn-, Fe- and Cu-phthalocyanines assemble on graphene/Co with identical structural configurations, but MnPc and FePc are strongly antiferromagnetically coupled with Co up to room temperature, while CuPc couples ferromagnetically with weaker thermal stability. The robust antiferromagnetic alignment is stabilized by a superexchange interaction, driven by the out-of-plane molecular orbitals responsible of the magnetic ground state and electronically decoupled from the underlying metal via the graphene layer, as confirmed by ab initio theoretical predictions. The

	strength and stability of the magnetic coupling is further optimized by the open 3d shell of the central Mn ion. These archetypal spin interfaces can be prototypes to demonstrate how antiferromagnetic/ferromagnetic coupling can be optimized by selecting the molecular orbital symmetry, paradigmatic examples to exploit in surface-supported molecular spin electronics.
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