Welcome Seminar

11 Dicembre 2025 - h14:00
Aula A

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Metal complexes in colorland: a story with a twist

Photo-active metal complexes are attracting a great deal of attention due to their application in light-emitting and light-harvesting devices, biomedicine, and photocatalysis. During the seminar, a short journey around the periodic table will be made presenting our most recent efforts on how choice of metal and its coordination sphere can have pivotal impact on modulating electro-, chiro-, and mechano-optical properties of metal complexes.
Achieving efficient emission in longer-wavelength region is intrinsically highly challenging and NIR-emitting devices are scarce to date. By means of dinuclearization strategies it will be shown, on one hand, how selective management of the excited-state mixing between singlet and triplet manifolds in heterobimetallic Ir^{III}/M^{I} (M^{I} = Cu^{I}, Au^{I}) complexes and, on the other hand, supramolecular interactions in earth-abundant Cu(I) complexes could help to counteract *energy gap law*. This led their successful and efficient application in red to NIR Light-emitting Electrochemical Cells (LECs) and as ElectroChemiLuminescece (ECL)-active species, providing the first examples of stable NIR LECs based on Cu(I) complexes. Besides, fundamental rationalisation of structure—circularly polarized luminescence (CPL) activity is still lacking and current design approaches are largely based on serendipity and *trial*-and-*error*. In this framework, first attempts of rationalization of CPL activity will be provided in enantiomerically pure Ir^{III}/M^{I} counterparts and Pt(II) complexes that represent rare examples of Circularly Polarized ElectroChemiLuminescence (CP-ECL) active compounds. Finally, it will be shown how supramolecular metal-ligand interactions can be used for preparing dynamic, photoswitchable, metallopolymeric materials that reversibly play as supramolecular “accordion” under orthogonal light stimuli.

Il Direttore del Dipartimento - Prof. Stefano Mammi