Speaker: Michele FABRIZIO (SISSA, Italy)

Title: **Local Kekulé distortions can stabilise topological insulating phases in magic-angle twisted bilayer graphene**

Abstract: We show that that Kekulé distortions localised in the AA regions of magic-angle twisted bilayer graphene can stabilise, in cooperation with Coulomb repulsion, topological insulating phases at any integer occupation of the four flat bands around the charge neutrality point. When the distortion is dynamical, those insulating phases are ferromagnetic, with a magnetic moment mostly contributed by orbital magnetisation. That implies theunavoidable coexistence of domains, each of them characterised by a different orientation of magnetisation as well as a different Chern number. Moreover, the coupling between the electrons and the Kekulé modes naturally explains the emergence of superconductivity away from integer filling, which is predicted to have either chiral d-wave character, or nematic one.