

ore 13.00: Seminario del vincitore della procedura valutativa a PA FIS/02 Dr. Mauro Lucio Papinutto

Titolo: Lattice QCD and flavour physics

The phenomenology of flavour physics and CP-violation represents a sector of the Standard Model (SM) that can be tested with great accuracy, leading eventually to the discovery of new physics beyond the SM. In the effective weak Hamiltonian formalism, amplitudes are obtained by computing perturbatively the Wilson coefficients and non-perturbatively the matrix elements of composite operators on hadron states. Using experimental results, this allows to improve the constraints on CKM (or BSM) parameters. In order to compute non-perturbative quantities (hadron and quark masses, weak matrix elements, renormalisation group running, form factors), the only known first-principle approach is represented by QCD regularised on a space-time lattice. Lattice QCD may moreover be extended to include a non-perturbative formulation of the effective theory of heavy quarks (HQET). I will present some important developments of lattice QCD to which I have contributed and their application to flavour physics, in particular to the computation of the b-quark mass and of indirect CP-violation in the neutral kaon system.