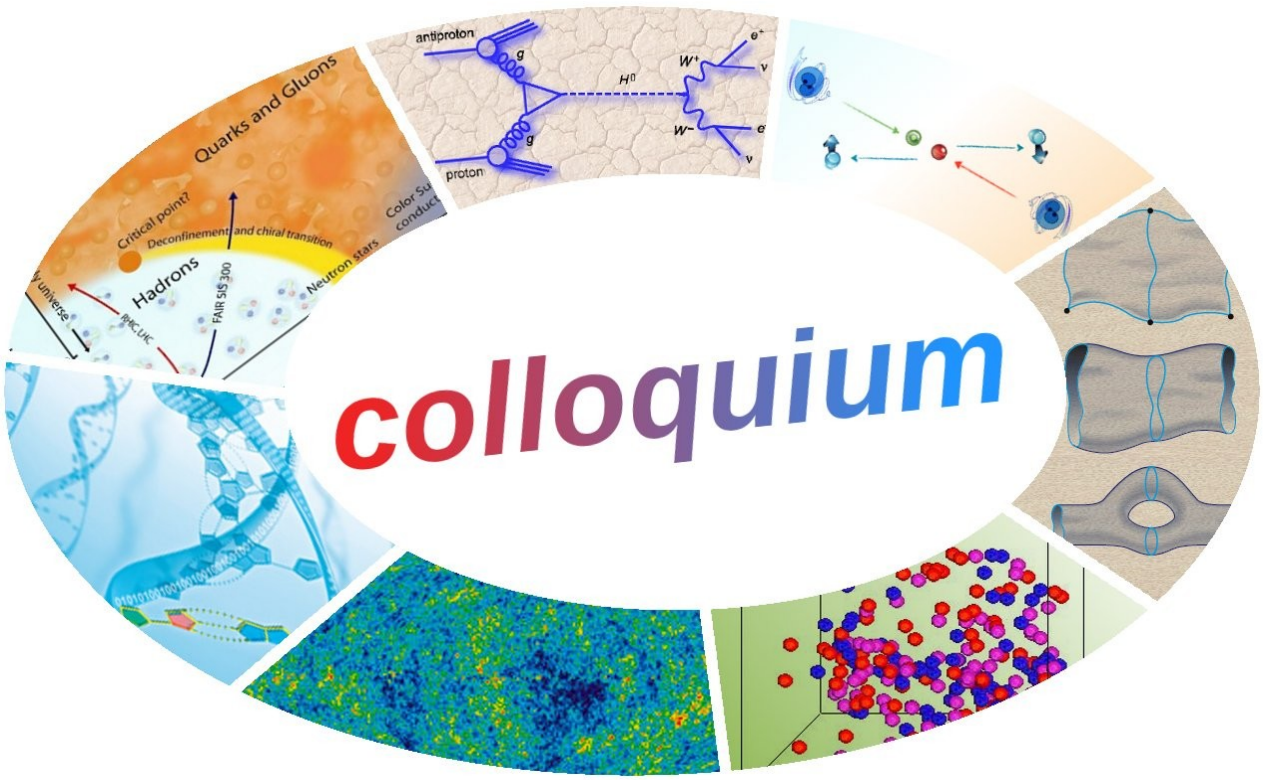
Università di Torino – Dipartimento di Fisica



Venerdì 23 Ottobre 2015, ore 14:30, Aula Magna

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Implications of Poincaré symmetry for thermal field theories

The analytic continuation to an imaginary velocity of the canonical partition function of a thermal system expressed in a moving frame has a natural implementation in the Euclidean path-integral formulation in terms of shifted boundary conditions. The Poincare' invariance underlying a relativistic theory implies a dependence of the free-energy on the compact length L0 and the shift xi only through the combination beta=L_0(1+xi^2)^(1/2). This in turn implies a set of Ward identities among the correlators of the energy-momentum tensor which have also interesting applications in lattice field theory. In particular, they offer identities to renormalize non-perturbatively the energy-momentum tensor and novel ways to compute thermodynamic potentials. I will present numerical results for the renormalization constants of the traceless components of the energy-momentum tensor obtained with a precision of roughly half a percent for values of the bare coupling constant in the range 0<=g^2<=1. Results for the equation of state of the SU(3) Yang-Mills theory obtained by implementing these ideas will be also discussed.