Bollettino Settimanale

Lunedì 15 aprile 2024

AULA 5A   ore 12.00
SEMINARIO DI FISICA STATISTICA

Interplay between an absorbing phase transition and synchronization in a driven granular system.

Raphäel Maire (LPS Université Paris-Saclay)

We study a quasi-2d granular system exhibiting an absorbing phase transition in its horizontal dynamics. By varying parameters, the transition can either be continuous or discontinuous based on the emergent degree of synchronization in the vertical motion. The observed phenomenology is investigated numerically using a realistic granular model and a simple coarse-grained model suitable for Event Driven Molecular Dynamics. A kinetic theory provide a rationalization of our findings through an effective non equilibrium thermodynamic potential.

AULA CONVERSI   ore 14.30
SEMINARI INFN
“Mini topical afternoon on flavor dynamics and new physycs”

Extending the Range and Precision of Lattice Flavourdynamics
Christopher Sachrajda (University of Southampton)

Precision Flavour Physics is a very powerful tool for exploring the limits of the Standard Model and in searches for New Physics. The precision of theoretical predictions for physical quantities is generally limited by our ability to evaluate the hadronic effects sufficiently accurately. In recent years, progress in Lattice QCD has improved to allow us to evaluate these non-pertubative effects for several quantities, such as leptonic decay constants and semileptonic form factors, at the percent level or better, requiring the introduction of isospin breaking corrections, and in particular QED effects, to make further progress. In order to apply Lattice QCD to other processes new theoretical methods are being developed. I will briefly review the status and prospects for these new developments, with illustrations including \epsilon_K, K \to \pi \pi decays and B_s \to \mu+ \mu- \gamma decays and I will discuss prospects for applying Lattice QCD to B_s \to K \mu+ \mu- decays. Much of the work that I will be reviewing has been done in collaboration with colleagues from Rome.

B-hadron semileptonic and rare decays: a laboratory for challenging the Standard Model
Marcello Rotondo (INFN LNF)

The decays of b-hadrons provide a useful tool for testing the Standard Model and restricting various New Physics scenarios. Recent measurements carried out at LHCb and B-Factories have revealed anomalies in semileptonic and rare b-hadron decays, which require further investigation. High-precision measurements from LHCb and Belle II depend heavily on theoretical inputs for both the interpretation of results and the estimation of key parameters through data fitting. I will provide an overview of the current status and future developments of some of these measurements, with a focus on experimental aspects that require theoretical insight from Lattice QCD. Furthermore, I will briefly discuss the impact of QED corrections and their handling in current measurements.

Martedì 16 aprile 2024

AULA 6   ore 13.00
SEMINARIO DI FISICA STATISTICA

Spectral density of an individual trajectory of an arbitrary Gaussian stochastic process.

Gleb Oshanin (LPTMC - Université Pierre et Marie Curie)

In this talk I will focus on the behavior of a particular random functional - the spectral density S(f,T) (with f being the frequency and T - the observation time) of an individual trajectory of an arbitrary stochastic centered Gaussian process. I will first recall the textbook definition based on the covariance function of the process, and show on several examples how diverse its functional form can be depending on a spread and a precise definition of the process. Then, I will specify the limitations of the standard definition and will go beyond it by considering the “noise-to-signal” ratio - the ratio of the standard deviation of S(f,T) and its mean value. Next, I will prove a simple but crucial double-sided inequality obeyed by the noise-to-signal ratio for any Gaussian process, any f and any T, and eventually will derive the full probability density function of S(f,T), under most general conditions. Lastly, for several Gaussian processes (as exemplified by Brownian motion, Ornstein-Uhlenbeck process, Brownian gyrator and fractional Brownian motion) I will discuss the behavior of the frequency-frequency correlations of such random variables and will demonstrate that they may be used as a robust property permitting to distinguish between normal and anomalous diffusion.

Mercoledì 17 aprile 2024

Giovedì 18 aprile 2024

Venerdì 19 aprile 2024