FONDAZIONE BRUNO KESSLER

ECT*
EUROPEAN CENTRE FOR THEORETICAL STUDIES IN NUCLEAR PHYSICS AND RELATED AREAS

Noisy environments: detecting signals in gravitational waves detectors

Friday, June 14, 2024 at 11:00

Alessandro Martini (University of Trento)

Signals buried in noisy environments appear in several contexts. Earth-based gravitational wave detectors of the LIGO-Virgo-KAGRA (LVK) collaboration are a perfect example of instruments dominated by noise. Developing proper analysis techniques is fundamental for detecting gravitational wave signals. Due to the complexity of these instruments, fitting a model for noise is an unfeasible task, and the properties of the underlying stochastic process are better inferred from the noise realization itself. Despite being a challenging task, several assumptions about noise properties allow us to characterize these systems in terms of wide-sense stationary processes. The Bayesian framework is suitable for studying such processes, connecting data analysis techniques with the theory of stochastic processes. We will explore this framework and the main ideas that made detecting these signals possible, and give a hint on how Bayesian principles such as Maximum Entropy can be used to marginalize our estimates over noise uncertainty.

General information:
The seminar will be held at ECT*, Villa Tambosi, Strada delle Tabarelle 286, Villazzano.
We are going to have a coffee break!

To reach Villa Tambosi: take bus number 13 from Povo or bus number 6 from the city center. The bus stops is in front of the Villa.
In order to organize the coffee break we kindly ask you to confirm your presence through the google form that you can find scanning the QR code.

Contacts: morresi@ectstar.eu - cconstantinou@ectstar.eu - zyao@ectstar.eu

Incoming Director of the ECT*: Professor Ubirajara van Kolck

The ECT* is part of the Fondazione Bruno Kessler. The Centre is funded by the Autonomous Province of Trento, funding agencies of EU Member and Associated states, and by INFN-TIFPA and has the support of the Department of Physics of the University of Trento.