2021 Winter School in Mathematical Physics

Wednesday 20 January 2021 - Friday 22 January 2021

Les Diablerets

Scientific Programme

Coadjoint orbits and equivariant localisation in finite and infinite dimensions by Anton Alekseev (Geneva)

In this mini-course, we will review the basics of the theory of coadjoint orbits including the Kirillov-Kostant-Souriau symplectic structure, Duistermaat-Heckman oscillating integrals and equivariant localization. Then, we will be heading to the infinite dimensional example of coadjoint orbits of the Virasoro algebra. We will review the classification of Virasoro coadjoint orbits and some approaches to the infinite dimensional Duistermaat-Heckman theory. If time permits, we will touch upon recent applications of coadjoint orbits to ideas of holography in physics.

Resurgence in mathematics and physics by Marcos Mariño (Geneva)

The theory of resurgence is a universal framework to extract physical and mathematical information from formal power series. It gives the promise of a better understanding of non-perturbative effects in physics, and it unveils remarkable mathematical structures in perturbation theory.

In this course, I will introduce the basic ideas and techniques of the theory of resurgence, and I will illustrate them in theories of interest to both mathematicians and physicists, like the exact WKB method and Chern-Simons invariants of knots.