

Talks in theoretical sciences

Monday, 21 November 2016, CLV B4

Time 10.00 - 10.30

Speaker Ulrike Riess (University of Bonn, Germany)

Title On Beauville's conjectural weak splitting property

Abstract: We present a result on the Chow ring of irreducible symplectic varieties. The main object of interest is Beauville's conjectural weak splitting property, which predicts the injectivity of the cycle class map restricted to a certain subalgebra of the rational Chow ring (the subalgebra generated by divisors). After introducing all necessary objects, I present the central result which confirms Beauville's weak splitting property in many cases. Finally, I sketch the main ingredients of the proof.

Time 11.15 - 11.45

Speaker Xin Sun (Massachusetts Institute of Technology, USA)

Title On Two-Dimensional Probability

Abstract: In recent years, there have been great advances in understanding two-dimensional large discrete objects and their scaling limits. A notable example is the discovery of a family of random non-self-crossing curves called Schramm Loewner evolution (SLE). In this talk, I will present two of my contributions in this area. The first one concerns the fine fractal property of SLE. The second one concerns the relation between SLE and another important two-dimensional random object called Gaussian free field. (Based on joint works with Gwynne, Miller, Li and Weston.)

Time 14.00 - 14.30

Speaker Gao Chen (Stony Brook University, USA)

Title Classification of gravitational instanton

Abstract: A gravitational instanton is a complete non-compact Calabi-Yau surface with appropriate curvature decay condition. We will discuss about the recent classification of gravitational instanton as well as the story before our work.

Talks in theoretical sciences

Monday, 21 November 2016, CLV B4

Time 15.15 - 15.45

Speaker Johannes Noller (University of Oxford, UK)

Title Effective cosmology

Abstract: Effective field theory (EFT) techniques from particle physics are currently revolutionising the way we understand cosmology. In this talk I will discuss two key examples of this: Firstly, I will show how EFT techniques allow us to better understand the fundamental degrees of freedom of gravity and cosmology, in particular what consistent theories can describe gravity at this fundamental level. Secondly, I will demonstrate how to construct an exhaustive "effective" theory of linear cosmological perturbations - the regime most easily accessible to observational constraints in modern day cosmology. Along the way this will turn out to have something interesting to say about efficiently parametrised cosmologies (a la PPN or PPF) and the construction of fully fledged new cosmological theories.

Time 16.30 - 17.00

Speaker Ziqi Yan (University of California, Berkeley, USA)

Title Nonrelativistic Naturalness and Graph Theory

Abstract: Some of the most fundamental questions in theoretical physics can be formulated as puzzles of naturalness, such as the cosmological constant problem and the Higgs mass hierarchy problem in high energy physics, and the linear resistivity of strange metals in condensed matter physics. In this talk I will discuss some surprises with naturalness from the study of nonrelativistic quantum field theories with anisotropic space and time scalings. The classification of these field theories is an essentially cohomological question, which is partially solved by the use of graph theory.