Cosmology and High Energy Physics VI

Laboratoire Charles Coulomb
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Abstracts

Philippe Brax

$(g-2)_\mu$ and screened modified gravity

What is the effect of a coupled scalar of the anomalous spin precession of particle? Could the (g-2) of the muon be explained by such models? This is what we shall see...

Vasilisa Nikiforova

Torsion bigravity: a purely geometric modified theory of gravity

I will present torsion bigravity, which is a theory of dynamical massive spin-2 field of geometrical origin (dynamical torsion field). I will cover various issues as: 1) motivation and theoretical basement of this type of modified gravity; 2) the torsion bigravity world: known solutions and their physical properties, phenomenological consequences. In particular, I will discuss some consequences for the black hole physics.

Patrick Peter

Charge-velocity-dependent one-scale model for cosmic string network evolution

The Velocity One Scale (VOS) model for cosmic string network evolution is extended to include possible currents flowing along the strings, and different regimes are shown to be present in the very simplified case of a linear equation of state. I'll present and explain these regimes and discuss why one can conclude that in the matter-dominated era, the average current should vanish unless nonlinear effects come to dominate.

Simone Speziale

New symmetries for general relativity?

I will discuss the recent proposals to enlarge the notion of asymptotic symmetry group from the BMS group to the inclusion of superrotations and Weyl transformations. I will present the mathematical framework and comment on its possible physical relevance.

Piotr Tourkine

Scattering from production in 2d and 4d

In this seminar, I will talk about recent results about a numerical method to find unitary S-matrices of gapped theories, such as the pion S-matrix in QCD. The method, based on works of Atkinson, was invented in the late 60s and was used as a proof of existence of functions that satisfy all of the S-matrix axioms in 4d. However, it was not put in practical use. Our recent results concern the implementation of those methods for S-matrices in two dimensions and four dimensions, using two different iterative schemes: a fixed-point iteration and Newton's method. Those schemes iterate the unitarity and dispersion relations, and converge to solutions to the S-matrix axioms. This numerical strategy provides a solution to the problem of reconstructing the scattering amplitude starting from a given particle production probability.

The talk should proceed as follows : after a general introduction to this general S-matrix material, and an attempt of a review at the state of the art in the domain, I will describe some of the results we obtained in 2d and some on-going work.