

G. Pereira)

Torsion and Gravitation: A New View

Abstract: according to the teleparallel equivalent of general relativity, curvature and torsion are two equivalent ways of describing the same gravitational field. Though curvature and torsion act differently: curvature yields a geometric description, in which the concept of gravitational force is absent whereas torsion acts as a true gravitational force, quite similar to the force of electrodynamics. As a consequence, the right-hand side of a spinless equation of motion (which would represent a gravitational force) is always zero in the geometric description, but not in the teleparallel case. This means that the gravitational coupling prescription can be minimal only in the geometric case. Relying on this new gravitational coupling prescription in the presence of curvature and torsion is proposed. It is constructed in such a way to preserve the equivalence between curvature and torsion and its basic property is to be equivalent to the usual coupling prescription of general relativity. According to this view, no new physics is connected with torsion, which is an alternative to curvature in the description of gravitation. An application of this formalism to the equations of motion of both a spinless and a spinning particle is discussed and supported by FINATEC.

20) Victor Rivelles (USP, São Paulo, Brazil)

Noncommutative Theories and Gravity

Abstract: There is a deep connection between noncommutative field theories and gravity. After the Seiberg-Witten map is performed the action for noncommutative field theories can be regarded as a coupling to a field dependent gravitational background.

21) Vladimir Mostepanenko (CBPF, Rio de Janeiro, Brazil, with G. L. Klimchitska)

Some Mathematical Aspects of the Lifshitz Formula for the Thermal Casimir Force

Abstract: we discuss recent controversies in application of the Lifshitz theory of the van der Waals and Casimir forces to real metals. The new rigorous derivation of the Lifshitz formula in terms of the reflection coefficients is proposed starting from the free energy of oscillations. It is demonstrated that if the reflection coefficients are expressed in terms of the dielectric permittivity of the Drude model, there arises a contradiction with thermodynamic stability. This contradiction is removed if the reflection coefficients are expressed in terms of the impedance. The physical reasons for this situation are explained.

22) Vladimir Pershin (UNIFEI, Minas Gerais, Brazil)

Gauge and Lorentz Anomalies in the Pure Spinor Formulation of the Heterotic Superstring

Abstract: the N=1 supergravity/super-Yang-Mills theory in D=10 has gauge and Lorentz anomalies which can be cancelled by Green-Schwarz mechanism for two specific