

# SEMPARIS – Séminaires en région parisienne

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## Séminaires à venir dans la série RENC-THEO

**Jeudi 15 Novembre 2018, 10 :00**

IHP, 201

Rencontres Théoriciennes

Domaines : hep-th

Titre : *Wilson Surface Central Charge*

Orateur : **Andy O’bannon ( University of Southampton )**

Résumé : *M-theory is currently our best candidate for a theory of everything, but remains mysterious. We know M-theory has M2- and M5-branes. The low-energy theory on a stack of coincident M2-branes is well-understood : it is maximally supersymmetric Chern-Simons-matter theory. However, the low-energy theory on a stack of coincident M5-branes remains poorly-understood : it is a maximally supersymmetric theory of self-dual strings with zero tension. In this talk I will discuss one type of probe of the M5-brane theory, namely self-dual strings with infinite tension. These play a role analogous to Wilson lines in gauge theories, but are two-dimensional surfaces rather than lines, and hence are called Wilson surfaces. I will describe holographic calculations of entanglement entropy associated with these infinite-tension self-dual strings, from which we extract a key parameter characterizing them, their central charge. This provides a count of the number of massless degrees of freedom living on them, and thus may shed light on some of the fundamental degrees of freedom of M-theory.*

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**Jeudi 15 Novembre 2018, 11 :40**

IHP, 201

Rencontres Théoriciennes

Domaines : hep-th

Titre : *A Stringy Test of the Weak Gravity Conjecture*

Orateur : **Timo Weigand** ( CERN )

Résumé : *Various swampland conjectures have been put forward in the recent literature to characterize general properties of an effective field theory which can be consistently coupled to quantum gravity. String theory as a framework for quantum gravity allows us to put these conjectures to a quantitative test. Among the earliest of these conjectures is the Weak Gravity Conjecture : It postulates the existence of a set of particles in any quantum gauge theory coupled to gravity whose charge-to-mass ratio must exceed that of an extremal black hole. In this talk we will verify this and further swampland conjectures in string theory, focussing for simplicity on string compactifications to six dimensions with 8 supercharges, in the vicinity of the weak coupling point of the gauge theory. Our proof of the Weak Gravity Conjecture near the weak coupling point combines various aspects of the Kähler geometry of complex surfaces, arithmetic properties of weak Jacobi forms and BPS invariants on Calabi-Yau threefolds. Along the way we elucidate the modification of the Weak Gravity Conjecture due to massless scalar fields. We find perfect agreement between the predictions of the modified conjecture and the charge-to-mass ratio of a set of physical stringy non-BPS states in the theory. Their charges span a sublattice of the full charge lattice, whose index we determine geometrically.*

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**Jeudi 22 Novembre 2018, 11 :40**

IHP, 314

Rencontres Théoriciennes

Domaines : hep-th

Titre : *Superconformal symmetry and classification of black hole horizons*

Orateur : **George Papadopoulos** ( King's College, London )

Résumé : *The horizon conjecture states that all near horizon geometries of extreme black holes that preserve some supersymmetry exhibit an  $sl(2, R)$  symmetry. I shall demonstrate the proof of the conjecture in some theories and use it to identify all the Killing superalgebras of near horizon geometries. An application of these results is that there are no near horizon geometries that preserve strictly more than 16 supersymmetries in 10 and 11 dimensions.*

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