# SEMPARIS – Séminaires en région parisienne

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## Cours

**Vendredi 30 Mars 2018, 10 :00**
IPHT, Salle Claude Itzykson, Bât. 774( https ://courses.ipht.cnrs.fr/ ?q=fr/node/196 )
Domaines : hep-th

Titre : *Asymptotic symmetries, black holes, and holography (4/5)*

Orateur : **Monica Guica ( IPhT )**

Résumé : *It is known since the work of Emmy Noether that continuous global symmetries lead to local conserved currents. In gauge theories such as electromagnetism or gravity, the currents associated to gauge transformations vanish because gauge symmetries are not physical symmetries, but rather redundancies of description. However, if the manifold on which the gauge theory is defined has a boundary and the gauge parameter does not vanish on it, then the associated conserved charge can be non-zero. Such gauge transformations that do not vanish at infinity are known as asymptotic symmetries and they act non-trivially on the space of states.*

*Asymptotic symmetries make a natural appearance in holography, the proposed equivalence between a theory of quantum gravity on a given manifold and a field theory living on its boundary. More precisely, they should correspond to global symmetries of the dual field theory. Despite the huge success of the AdS/CFT holographic correspondence, holography for most spacetimes of interest remains very poorly understood. One may then hope that the study of asymptotic symmetries, especially when there is an infinite number of them, can shed light on the nature of the dual field theory.*

*In this course, we will study several examples of gravitational backgrounds for which the group of asymptotic symmetries is infinite-dimensional, such as $AdS_3$, the near horizon of extreme black holes, and flat space. In the latter case, a parallel development relates asymptotic symmetries to the soft behaviour of scattering amplitudes, providing a new perspective on these well-known results. The black holes will always be lurking in the background.*

*1. Introduction to the covariant phase space formalism and construction of the conserved charges.*

*2. Asymptotic symmetries of $AdS_3$ gravity and generalization to extreme Kerr black holes.*
*3. Asymptotic symmetries of flat space : supertranslations, superrotations and the memory effect.*
*4. Symmetries of scattering in flat space and relation to soft theorems.*

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