SEMPARIS – Séminaires en région parisienne

http ://string.lpthe.jussieu.fr/semparis/

TBA

Mercredi 27 Mai 2015, 10 :30
IHES, Amphithéâtre Léon Motchane(Cours de l'IHES)
Domaines : hep-th

Titre : *Motivic periods and the cosmic Galois group (4/4)*

Orateur : **Francis Brown (CNRS, IHÉS)**

Résumé : *In the 1990's Broadhurst and Kreimer observed that many Feynman amplitudes in quantum field theory are expressible in terms of multiple zeta values. Out of this has grown a body of research seeking to apply methods from algebraic geometry and number theory to problems in high energy physics. This talk will be an introduction to this nascent area and survey some recent highlights.*

Most strikingly, ideas due to Grothendieck (developed by Y. André) suggest that there should be a Galois theory of certain transcendental numbers defined by the periods of algebraic varieties. Many Feynman amplitudes in quantum field theories are of this type. P. Cartier suggested several years ago applying these ideas to amplitudes in perturbative physics, and coined the term 'cosmic Galois group'. One of my goals will be to describe how to set up such a theory rigorously, define a cosmic Galois group, and explore its consequences and unexpected predictive power.

Topics to be addressed will include :

1) A Galois theory of periods, multiple zeta values. 2) Parametric representation of Feyman integrals and their mixed Hodge structures. 3) Operads and the principle of small graphs. 4) The cosmic Galois group : results, counterexamples and conjectures.