

Mathematics Department Colloquium

Organizer: Vaughan Jones

Thursday, 4:10–5:00pm, 60 Evans

March 1 **Matilde Marcolli**, Max Planck Institute, Bonn

Renormalization and Galois symmetries.

The work of Connes-Kreimer showed that the procedure of renormalization in perturbative quantum field theory can be understood conceptually as the Birkhoff factorization of loops in the affine group scheme dual to the commutative Hopf algebra of Feynman graphs of the theory. Based on joint work with Connes, I will show how the structure of the divergences of Feynman diagrams can be described in terms of a class of differential systems with singularities. The corresponding affine group scheme obtained via the Riemann-Hilbert correspondence is a universal group of symmetries of physical theories that naturally generalizes the renormalization group.