Colloquium – Mardi 16 mai 2017

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Complex Multiplication or is $e^{\pi\sqrt{163}}$ an Integer ?

Roots of unity are algebraic values of the exponential function at rational multiples of $i\pi$. Kronecker's Jugendtraum was to find analytic functions that mimic this behavior for algebraic numbers of higher degree. The theory of complex multiplication of elliptic curves provides a rich trove of examples of such functions with many surprising symmetries. It originated in the 19th century in work of Kronecker and Weber and underwent a remarkable development in the 20th century by Hilbert, Shimura, Deligne and many others.

In this talk I will provide a glimpse into some classical aspects of complex multiplication from a diophantine point of view. Then I will discuss recent questions connected to problems in diophantine geometry, some of them are joint work with Pila and more recently with Bilu-Kühne.