

Victor Rotger (UPC) : **Weight one modular forms, Gross-Stark units and points on elliptic curves**

Abstract : Let  $E$  be an elliptic curve over  $\mathbf{Q}$  and let  $\rho_b$  and  $\rho_{\sharp}$  be odd two-dimensional Artin representations such that  $\rho_b \otimes \rho_{\sharp}$  is self-dual. The progress on modularity achieved in the last decades ensures the existence of normalised eigenforms  $f, g, h$  of respective weights 2, 1 and 1, giving rise to  $E, \rho_b$ , and  $\rho_{\sharp}$  via the constructions of Eichler-Shimura and Deligne-Serre. In this lecture I will discuss a conjecture by H. Darmon, A. Lauder and myself relating certain  $p$ -adic iterated integrals attached to the triple  $(f, g, h)$  to logarithms of Gross-Stark units in the number field cut out by  $\text{ad}^0(\rho_b)$  and global points on  $E$  defined over the number field cut out by  $\rho_b \otimes \rho_{\sharp}$ .