1145-11-428          **Mahesh R Kakde\*** (`mahesh.kakde@kcl.ac.uk`), King's College London, Mathematics department, Strand, London, WC2R2LS, United Kingdom. *Explicit formulae for Gross-Stark units and Hilbert's 12th problem.*

In this talk I will report on my joint work with Samit Dasgupta on the tower of fields conjecture first formulated by Gross. This conjecture proves a conjecture of Dasgupta on explicit $p$-adic analytic formulae for Gross-Stark units. These units, when considered for all primes of a totally real number field $F$, generate the maximal abelian CM extension of $F$ and therefore our work can be considered as giving a $p$-adic analytic solution to Hilbert's 12th problem. Further, the tower of fields conjecture also proves a conjecture of Dasgupta and Spiess which gives a $p$-adic analytic formulae, in terms of Eisenstein cocycles, for the characteristic polynomial of the Gross regulator matrix. (Received September 06, 2018)