



INDIAN STATISTICAL INSTITUTE
Theoretical Statistics and Mathematics Unit, Kolkata

NUMBER THEORY LECTURES

DATES:

January 30, 2023, Monday
February 01, 2023, Wednesday
February 03, 2023, Friday
Time: 11 AM to 1 PM

VENUE:

L-infinity
(5th Floor, A.N. Kolmogorov Bhavan), ISI Kolkata

TITLE:

The Harman sieve and trigonometric polynomials

SPEAKER:

Olivier Ramaré

CNRS/ Aix-Marseille Université

ABSTRACT:

We shall first prove that $S(\sqrt{2}) \ll N^{5/6 + \varepsilon}$ where $S(\alpha) = \sum_{b \leq N} \mathbf{1}_{\alpha b} \mathbf{1}_{\square}$ and b is a sum of two squares. No identity on the line of Gallagher-Vaughan or Linnik is available and we use a combination of a variant of the Vinogradov method together with a version of the Harman sieve. We shall take this opportunity to deliver a simple presentation of the Harman sieve.

We will proceed to show that, given any irrational α and any real β , there are infinitely many solutions to $|\alpha b - \beta| < 1/b^{1/4}$ where b is a sum of two squares and we will give an asymptotic for this when $\alpha = \sqrt{2}$. This will reveal another aspect of the method: the usage of auxiliary problems. In between we shall present the situation when the variable b is prime.

ALL ARE CORDIALLY INVITED