Number Theory Day - 2026

January 9th, 2026

Lecture Schedule

Lectures Timings	Friday (9 January)
09:30 – 10:30	Pierre Colmez **(AG-66)**
10:30 – 11:00	TEA
11:00 – 12:00	Najmuddin Fakhruddin **(AG-66)**
12:10 – 13:10	Shalini Bhattacharya **(AG-66)**
13:10 – 14:15	LUNCH
14:30 – 15:30	Shivansh Pandey **(AG-66)**
15:30 – 16:00	TEA
16:00 – 17:00	Abhinandan **(AG-69)**

Lectures will be held in the Lecture Room AG-66 and AG-69 of the Institute.

Number Theory day

January 09, 2026

Abstracts of Talks

School of Mathematics
Tata Institute of Fundamental Research

Title of Talks

Pierre Colmez	*A locally analytic approach to the p-adic local Langlands correspondence for* $\mathrm{GL}_2(\mathbb{Q}_p)$
Najmuddin Fakhruddin	*Lifting global Galois representations*
Shalini Bhattacharya	*Reduction of certain Galois representations modulo* 2
Shivansh Pandey	*Reductions of Banach spaces attached to Hilbert modular forms of slopes in (0,1)*
Abhinandan	*p-adic Galois representations and linear algebra*

Abstracts

Friday, 9 January 2026 (09:30-10:30)

Speaker : Pierre Colmez
Title : A locally analytic approach to the p-adic local Langlands correspondence for $\mathrm{GL}_2(\mathbb{Q}_p)$

The p-adic local Langlands correspondence for $\mathrm{GL}_2(\mathbb{Q}_p)$ is by now rather well understood, but the architecture of the proofs is quite intricate. I will present a locally analytic approach that simplifies this overall architecture (joint work with Joaquin Rodrigues Jacinto).

Friday, 9 January 2026 (11:00-12:00)

Speaker : Najmuddin Fakhruddin
Title : Lifting global Galois representations

I will give an overview of joint work with Chandrashekhar Khare and Stefan Patrikis done a few years ago on lifting mod p representations of the absolute Galois group of a global field (valued in a reductive group) to characteristic zero. Roughly speaking, our results say that (under some fairly general conditions) if the representation has local lifts and a suitable "oddness" condition is satisfied, then it has a global lift, and we are also able to control the local behaviour of the lifts.

Friday, 9 January 2026 (12:10-13:10)

Speaker : Shalini Bhattacharya
Title : Reduction of certain Galois representations modulo 2

We will discuss the problem of mod p reduction of p-adic local Galois representations for a given prime number p. For $k \in \mathbb{Z}_{\geq 2}$ and $a_p \in \mathfrak{m}_{\overline{\mathbb{Q}}_p}$, the reduction mod p of the two-dimensional crystalline representations V_{k,a_p} of the local Galois group $\mathrm{Gal}(\overline{\mathbb{Q}}_p/\mathbb{Q}_p)$ can be computed using the compatibility of the p-adic and mod p Local Langlands Correspondences. This method was first introduced by Christophe Breuil in 2003 and has subsequently been used by many others, for example in the works of Buzzard–Gee, and Ghate and his co-authors at small slopes. However, there is a gap in the literature, as most of the above results are available only for odd primes or sufficiently large primes. We will look into the curious case of $p = 2$, and give a complete description of the reduction $\overline{V}_{k,a_2}$ when the slope lies in $(0, 1]$. We will compare our results with some existing results for odd primes. This is joint work with Arathy Venugopal.

Friday, 9 January 2026 (14:30-15:30)

Speaker : Shivansh Pandey
Title : Reductions of Banach spaces attached to Hilbert modular forms of slopes in (0,1)

Let F be a totally real field. In this talk we will study a certain p-adic $\mathrm{GL}_2(\mathbb{Q}_{p^f})$-Banach space that one might attach to a Hilbert modular form over F of slope in $(0,1)$ when p is inert in F. We will investigate a lattice in this Banach space and study its mod p reduction. We will give conditions under which all the JH factors of the reduction are supercuspidal. This talk is based on joint work in progress with Prof. Ghate.

Friday, 9 January 2026 (16:00-17:00)

Speaker : Abhinandan
Title : p-adic Galois representations and linear algebra

In number theory, one of the central objects of study are representations of Galois groups, for example, $G_{\mathbb{Q}}$ the group of automorphisms of the field of algebraic numbers over the field of rational numbers. A famous application of (p-adic) representations of $G_{\mathbb{Q}}$ is the resolution of Shimura—Taniyama conjecture by Wiles and Taylor which led to a proof of Fermat's Last Theorem. In this talk, we will consider p-adic representations of $G_{\mathbb{Q}}$ coming from geometry, and look into their behaviour locally at a prime p using linear algebra objects, for example, (φ,Γ)-modules, coming from p-adic Hodge theory.