School of Mathematics
Tata Institute of Fundamental Research

29 September, 2022

Mathematics Colloquium

Speaker	:	*Chandrashekhar Khare*
Affiliation	:	*University of California, Los Angeles*
Title	:	*Modularity of Galois representations, from Ramanujan to Serre's conjecture and beyond*
Date & Time	:	*Thursday, 6 October, 2022 at 4.00 p.m.*
Venue	:	**Lecture Theatre (AG-66)**

Abstract

Ramanujan made a series of influential conjectures in his 1916 paper "On some arithmetical functions" on what is now called the Ramanujan τ function. A congruence Ramanujan observed for $\tau(n)$ modulo 691 in the paper led to Serre and Swinnerton-Dyer developing a geometric theory of mod p modular forms. It was in the context of the theory of mod p modular forms that Serre made his modularity conjecture, which was initially formulated in a letter of Serre to Tate in 1973.

I will describe the path from Ramanujan's work in 1916, to the formulation of a first version of Serre's conjecture in 1973, to its resolution in 2009 by Jean-Pierre Wintenberger and myself. I will also try to indicate why this subject is very much alive and, in spite of all the progress, still in its infancy. I will end with some questions about counting mod p Galois representations, and the use of Serres conjecture in the" computational Langlands program'.

Milind Pilankar