



复旦大学数学科学学院 数学综合报告会

报告题目: **PGL₂-crystalline local systems on the projective line minus 4 points and torsion points on the associated elliptic curve**

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报告地点: 光华东主楼 1501

摘要: In my talk I shall report my recent joint work with R.R. Sun and J.B. Yang. Given an odd prime p we take t to be a number in an unramified extension of the p -adic number ring \mathbb{Z}_p such that $t \pmod{p}$ is not equal to 0 and 1, and C_t to be the elliptic curve defined by the affine equation $y^2 = x(x-1)(x-t)$.

For $q = p^n$ we speculate the set of points in $C_t(\mathbb{F}_q)$ whose order coprimes to p corresponds to the set of $\text{PGL}_2(\overline{\mathbb{F}_q})$ -crystalline local systems on $\mathbb{P}^1 - \{0, 1, \infty, t\}$ over some unramified extension of the p -adic number field \mathbb{Q}_p via periodic Higgs bundles and the p -adic Simpson correspondence recently established by Lan-Sheng-Zuo for GL -case and Sun-Yang-Zuo for PGL -case.

In the arithmetic setting, given an algebraic number field K we introduce the notion of arithmetic local systems and arithmetic periodic Higgs bundles and speculate the set of torsion points in $C_t(K)$ corresponds to the set of PGL_2 -arithmetic local systems on $\mathbb{P}^1 - \{0, 1, \infty, t\}$ over K . It looks very mysterious. M. Kontsevich has already observed that the $K3$ surface as the Kummer surface of the elliptic curve C_t also appears in the construction of the Hecke operators which define the l -adic local systems on $\mathbb{P}^1 - \{0, 1, \infty, t\}$ over \mathbb{F}_q via the GL_2 Langlands correspondence due to V. Drinfeld.

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