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Colloquium

PGL₂-crystalline local systems on the projective line minus 4 points and torsion points on the associated elliptic curve

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Abstract: 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 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 $C_t(F_q)$ whose order coprimes to p corresponds to the set of $PGL_2(\overline{F}_q)$-crystalline local systems on $\mathrm{P}^1 - \{0, 1, \infty\}$ over some unramified extension of the p-adic number field 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 *PGL₂*-arithmetic local systems on $\mathrm{P}^1 - \{0, 1, \infty\}$ 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 $\mathrm{P}^1 - \{0, 1, \infty\}$ over F_q via the GL_2 Langlands correspondence due to V. Drinfeld.

Date:	Friday, 22 December 2017
Time:	10:30 a.m. – 11:30 a.m.
Venue:	Rm 222, Lady Shaw Building, The Chinese University of Hong Kong, Shatin

All are Welcome!