

# Nonabelian local class field theory and the geometry of Lubin-Tate spaces

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In this mini-course, we will give an overview of the beautiful story of Lubin-Tate deformation spaces. This story begins with the original 1965 paper of Lubin and Tate, who used formal groups to construct all of the abelian extensions of a given nonarchimedean local field  $F$ , all in purely local manner. Lubin-Tate deformation spaces arise when one wants to extend this picture to include non-abelian extensions of  $F$  (or more precisely, to representations of the absolute Galois group of  $F$  of higher degree). Topics will include:

- Formal modules and  $p$ -divisible groups.
- The local Langlands correspondence for  $GL(n)$ .
- The  $p$ -adic upper half plane, and period mappings.
- Formal models for Lubin-Tate spaces in dimension 1.

Suggested reading:

1. J. Lubin and J. Tate, *Formal Complex Multiplication in Local Fields*. Annals of Math., 1965. <http://www.jstor.org/pss/1970622>
2. C. Bushnell and G. Henniart, *The Local Langlands Conjecture for  $GL(2)$* . Springer-Verlage, 2006. (Esp. chapters 7-8)
3. O. Brinon and B. Conrad, *CMI Summer School Notes on  $p$ -Adic Hodge Theory*. <http://math.stanford.edu/~conrad/papers/notes.pdf>. (Through section 9.)
4. S. Dasgupta and J. Teitelbaum, *The  $p$ -adic upper half plane*. <http://math.arizona.edu/~swc/aws/07/DasguptaTeitelbaumNotesMar10.pdf>, just Lecture 1.