p-adic Geometry and Analysis

Handbook Last updated: 2024 年 6 月 3 日

目录

1 General info

1.1 (General info).

- Conference Time: June 6-9, 2024.
- Place: M1001, located on 1st Floor of College of Science Building.
- Scientific Committee: Ruochuan Liu, Liang Xiao
- Organizers: Gao Hui, Wang Yupeng
- Website: https://huigaomath.github.io/p-geom-ana-2024.html

1.2. Some Phone numbers

- Leyuan Shen: conference secretary. 17688530946

2 Schedule

Time	June 7	Time	June 8	June 9
09:45–10:45	Yixiao Li	10:00–10:45	Yuanyang Jiang (special time!)	TBA
10:45–11:05	☕ (*tea break*)	10:45–11:15	☕	NO TEA
11:05–12:05	Jiahong Yu (special time!)	11:15–12:00	Yuanyang Jiang (special time!)	FREE DISCUSSION
14:30–15:30	Zekun Chen		Tian Qiu	END
15:30–16:00	☕		☕	
16:00–17:00	Zekun Chen		Benchao Su	

3 Title and Abstract

June 7, Friday

Title: A p-adic Riemann-Hilbert functor for Zariski-constructible sheaves over rigid varieties
Speaker: Yixiao Li
Abstract: Let X be a rigid variety over a p-adic number field. The Riemann-Hilbert functor for p-adic local systems has been constructed by Liu-Zhu. There is a modification of this construction which works for Zariski constructible sheaves, as indicated by Bhatt-Lurie in the case of algebraic varieties. In this talk, we construct a version of the Riemann-Hilbert functor, which sends Zariski-constructible sheaves on X to filtered $\mathcal{D}$-modules, and show its basic properties.

Title: Title: A sheafified geometric Riemann-Hilbert correspondence
Speaker: Jiahong Yu
Abstract: Let X be a smooth rigid variety over a local field K of characteristic 0. Due to the work by Ruochuan Liu and Xinwen Zhu, there is a geometric Riemann-Hilbert functor sending a $\mathbb{Q}_p$-local systems to vector bundles with integrable connections on a certain ringed space $\mathcal{X}$. We want to generalise this construction to an equivalence between $\mathbb{B}_{\mathrm{dR}}^+$-local systems and vector bundles with integrable connections on some certain ringed spaces. In this talk, I will prove a sheafified generalisation, say for any smooth adic space X over $\mathbb{B}_{\mathrm{dR}}^+(K, K^+)$ where (K, K^+) is a perfectoid Tate-Huber pair, there is a canonical isomorphism between the sheaf of isomorphic classes of vector bundles with integrable t-connections and the sheaf of isomorphic classes of $\mathbb{B}_{\mathrm{dR}}^+$-local systems. This is also a generalisation of Heuer's sheafified p-adic Simpson correspondence.

Title: Period sheaves over the Fargues-Fontaine curve
Speaker: Zekun Chen
Abstract: Let X be a smooth formal scheme over $\mathcal{O}_k$, a finite extension of $\mathbb{Q}_p$, We construct a period sheaf $\mathcal{O}\mathbb{C}^I$ for each closed interval $I \subseteq (0, \infty)$ that contains 1. These period sheaves admits Poincare's lemma, and will lead to the computation of the cohomology of B_I. Moreover, the cohomology gives us a vector bundle on the Fargues-Fontaine curve.

June 8, Saturday

Title: Partial de Rham family of Hilbert modular forms
Speaker: Yuanyang Jiang
Abstract: We compute the Fontaine operator in the setting of Hilbert modular varieties, after taking b-cohomology, extending the work of Lue Pan in the modular curve case. As an application, we prove under some condition on weights that for overconvergent Hilbert modular forms, the partial de Rhamness condition on the Galois representation will imply the overconvergent form extends in one direction, i.e. it is "partially classical". Moreover, under generic condition, the partial classical overconvergent Hilbert modular forms vary in family.

Title: Title: Locally analytic vectors in the completed cohomology of unitary Shimura curves

Speaker: Tian Qiu

Abstract: We use the methods introduced by Lue Pan to investigate the locally analytic vectors in the completed cohomology of Unitary Shimura curves. As some applications, we prove a classicality result on two-dimensional representation ρ of Gal_F such that $\rho|_{\mathrm{Gal}_L}$ is regular σ-de Rham and it appears in the locally σ-analytic vectors of the completed cohomology, where F is a number field, L is a p-adic place of F and $\sigma : L \hookrightarrow E$ is an embedding of L to a sufficiently large finite extension of $\mathbb{Q}_p$. We also prove that in this case, the ρ-isotypic part in the locally σ-analytic vectors of the completed cohomology only depends on the local Galois representation $\rho|_{\mathrm{Gal}_L}$. This is a joint work with Benchao Su.

Title: Translations and the locally analytic Ext^1 conjecture in the $\mathrm{GL}_2(L)$ case

Speaker: Benchao Su

Abstract: Let p be a prime number. Let L be a finite extension of $\mathbb{Q}_p$, and let E be a suficiently large finite extension of L. Let ρ_p be a 2-dimensional E-linear continuous representation of $\mathrm{Gal}(\bar{L}/L)$, which is de Rham with regular Hodge-Tate weights. When ρ_p is of global origin, we give a strong evidence on Breuil's locally analytic Ext^1 conjecture for ρ_p. The proof is based on a detailed geometric study of the locally analytic sections on certain completed unitary Shimura curves, à la Lue Pan, and a geometric realization of the translation functors on locally analytic representations. If time permits, we will discuss furthur the case where the underlying Weil-Deligne representation of ρ_p is irreducible.

4 Accommodation and Transportation (Chinese ver)

中文版 (Chinese version.) (cf. later for English version.)

HOTEL info.

君璞酒店:

Address: 南山区留仙大道 3333 号塘朗城西区 C 座 6-16 楼。

入住方式: 报自己姓名, 说南科大数学系预订的即可

Hotel phone number: (0755)27776988

6pm 之后到达，最好和酒店打个招呼保留预约。

雅园塘朗酒店 (深圳西丽南科大店):

地址: 深圳市南山区学苑大道 1133-1 号

可以打车；或者地铁到塘朗站之后步行

入住方式: 报自己姓名, 说南科大数学系预订的即可

联系电话:(0755)22233030

6pm 之后到达，最好和酒店打个招呼保留预约。

机场/火车站去君璞酒店 强烈建议打车直接到酒店。从塘朗地铁站找到酒店会花费一些时间；因为酒店位于一个复杂的 mall 内部。

如果是坐地铁到达，不要按照高德地图指示，而是从塘朗地铁站 A 出口直接进入塘朗城，往右前方走，进入乐购超市和万宁之间的走道，然后左转，可以看到君璞酒店的广告牌，广告牌左边即为酒店的电梯，乘坐电梯到 7 楼，7 楼为前台大厅及餐厅。如果乘坐计程车，直接到酒店 1 楼门口（背向留仙大道一侧），乘坐电梯上 7 楼。

从酒店到报告厅

1. 找到南科大 1 号门（见下图。）
2. 秘书会提前通知大家申报 QR 进校码。可以进校门。
3. 步行过桥就到了理学院。理学院有个楼之间天桥，那里右转最近的入口就是数学系 1 楼。
4. 实在找不到就找到瑞幸咖啡，那里紧挨着数学系。


星巴克
Luckin Coffee
南方科技
大学行政楼
Math Dept
大沙河生态长廊
绿道-嬉游草坪
翠谷公
Entrance to Univ
中国电信
华晖云门
宝能影城
弘基翰林九锡
中信银行
宝能环球
汇直营店
Metro Sta.
塘朗
Junpu Hotel near

5 Accommodation and Transportation (English ver)

HOTEL info.

Genpla Hotel (Pronounced as JunPu Hotel in Chinese.) 君璞酒店:

Address: Shenzhen City LiuXian Road No. 3333. 南山区留仙大道 3333 号塘朗城西区 C 座 6-16 楼。

Stay-in method: Tell them your name and that you have a room reserved by the math department

Hotel phone number: (0755)27776988

If you arrive after 6pm, it is better to let us know, so we can keep the reservation.

Airport/Train Station to Genpla Hotel:

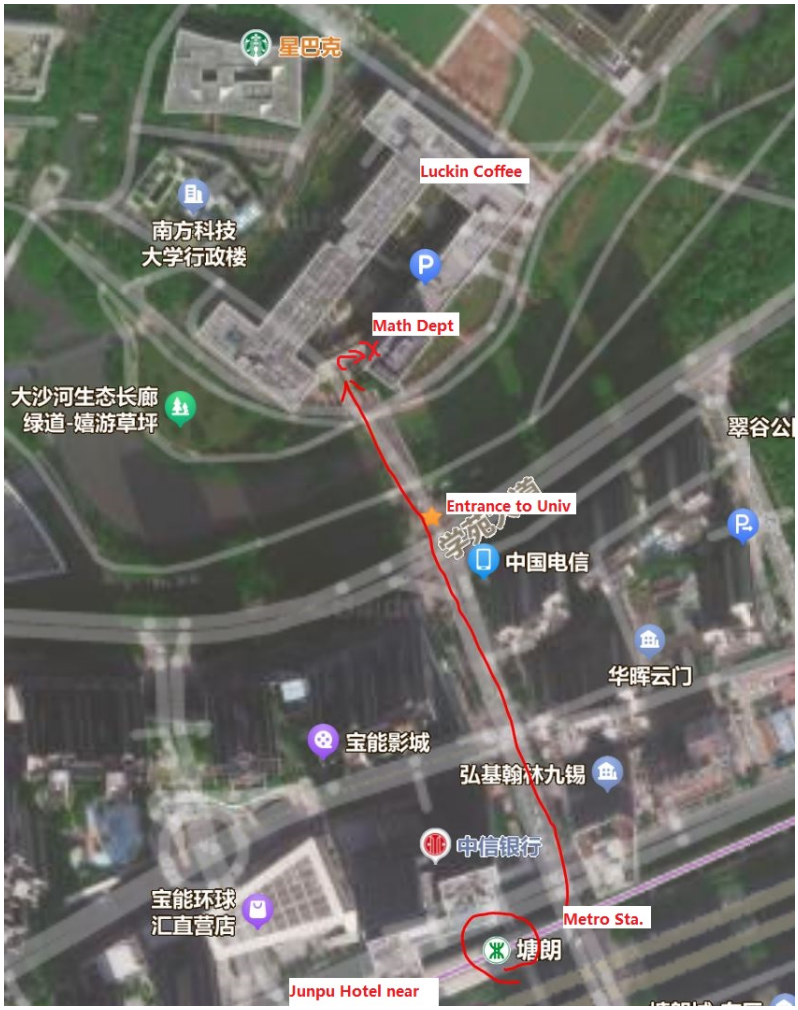
International Guests (if you do not speak Chinese). We strongly recommend taking a Taxi.

Notes to Taxi driver: Please bring me to Junpu (Genpla) Hotel.

Chinese: 请带我去深铁塘朗城君璞酒店。靠近塘朗地铁站。准确地址：南山区留仙大道 3333 号塘朗城西区 C 座 6-16 楼。

From Hotel to workshop Lecture room.

The workshop will take place in Room M1001 of Math Department in the Science building.



1. It should be easy to locate TangLang metro station (it is close to JunPu hotel); circled in bottom of picture.
2. go north and follow the obvious road leading to Main Gate 1 of SUSTech.
3. See below for getting inside SUSTech through Gate 1.
4. Once inside, pass the bridge in front of you, then you are at Science Building. There is an *overpass* between two buildings and the RHS is the entrance to **Math Dept.** Room M1001 is on the 1st floor of Math Department.

How to get into SUSTech campus:

1. **International Guests**.
   - if you use wechat, our secretary will help you to set up some QR code to get in campus.
   - if you do NOT use wechat, try showing your passport to entrance guard at the gate and saying you are visiting Dept of Mathematics. Maybe they don't speak English... in the worst case, you can try asking students walking by.
   - Another helpful item. Show entrance guard my ID picture.