

NOTETAKER CHECKLIST FORM

(Complete one for each talk.)

Name: KAROL KOZIOL Email/Phone: kkoziol@ualberta.ca

Speaker's Name: SAM RASKIN

Talk Title: MODULI OF RESTRICTED SHIMURA AND THE CRYSTAL OF

Date: 4 / 11 / 19 Time: 2 : 00 am / (pm) (circle one) SHEAVES ON IT II

Please summarize the lecture in 5 or fewer sentences: THE SPEAKER CONTINUED
TALKING ABOUT LOCAL SHIMURA; IN PARTICULAR THE
CONSTRUCTED CERTAIN SHEAVES ON THE MODULI SPACE
OF LOCAL SHIMURA, AND PARTIAL FROBENIUS MAPS
BETWEEN THEM

CHECK LIST

(This is NOT optional, we will not pay for incomplete forms)

- Introduce yourself to the speaker prior to the talk. Tell them that you will be the note taker, and that you will need to make copies of their notes and materials, if any.
- Obtain ALL presentation materials from speaker. This can be done before the talk is to begin or after the talk; please make arrangements with the speaker as to when you can do this. You may scan and send materials as a .pdf to yourself using the scanner on the 3rd floor.
 - **Computer Presentations:** Obtain a copy of their presentation
 - **Overhead:** Obtain a copy or use the originals and scan them
 - **Blackboard:** Take blackboard notes in black or blue PEN. We will NOT accept notes in pencil or in colored ink other than black or blue.
 - **Handouts:** Obtain copies of and scan all handouts
- For each talk, all materials must be saved in a single .pdf and named according to the naming convention on the "Materials Received" check list. To do this, compile all materials for a specific talk into one stack with this completed sheet on top and insert face up into the tray on the top of the scanner. Proceed to scan and email the file to yourself. Do this for the materials from each talk.
- When you have emailed all files to yourself, please save and re-name each file according to the naming convention listed below the talk title on the "Materials Received" check list.
 (YYYY.MM.DD.TIME.SpeakerLastName)
- Email the re-named files to notes@msri.org with the workshop name and your name in the subject line.

- RASKIM

MAIN CONSTRUCTION

~~THE~~ INPUT: I FINITE SET

$$d: I \rightarrow \mathbb{Z}_{\geq 0}$$

$$W \in \text{REP}(\hat{G}^I)$$

$$V \in \text{REP}(G(k(\ell))) = D(B(G(k(\ell))))$$

$$B(G(k(\ell)))$$



$$\text{LocShet}^{\text{MER}}$$

OUTPUT: $\mathcal{F}_{I,W,V,d} \in D(\text{LocShet}^{\text{MER}})$

CONSTRUCTION:

$$\text{LocShet}_{(X-x)^I}^{\text{MER}} = \mathbb{Z}_{(X-x)^I}^+ G \setminus G_{\text{TR}_{G,(X-x)^I}} \times \text{LocShet}^{\text{MER}}$$

$$\text{SAT}_{(X-x)^I}(W) \in D(\mathbb{Z}_{(X-x)^I}^+ G \setminus G_{\text{TR}_{G,(X-x)^I}})$$

$$j!V \in D(\text{LocShet}^{\text{MER}})$$

$$\Delta_d: X \longrightarrow X^I$$

$$y \longmapsto (\text{FR}^{d(i)}(y))_{i \in I}$$

THEN

$$\mathcal{F}_{I,W,V,d} = \Psi_{X-x} \left(\Delta_d^! \left(\text{SAT}_{(X-x)^I}(W) \boxtimes j!V \right) \right)$$

GOAL GIVE PARTIAL FROB MAPS

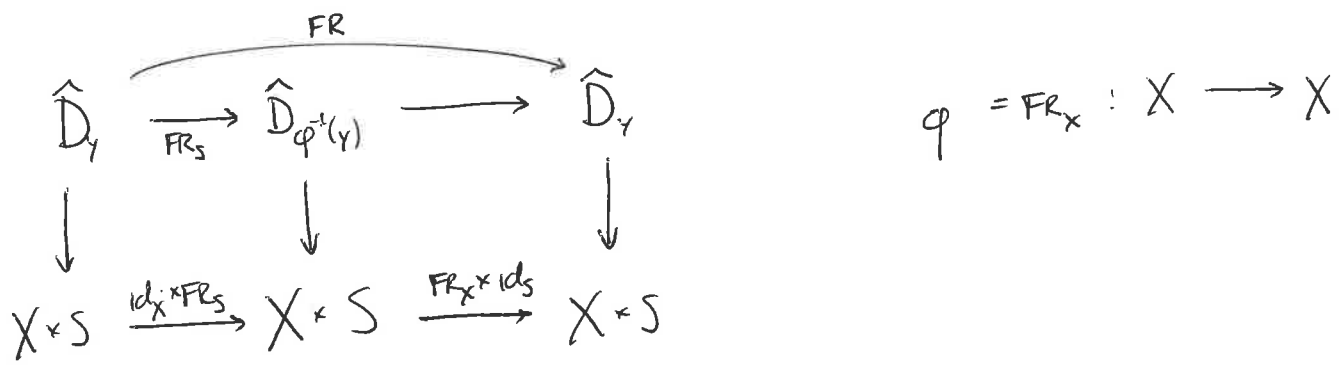
$$FR^{d'} \mathcal{F}_{I,W,V,d} \longrightarrow \mathcal{F}_{I,W,V,d+d'} \quad \forall d, d' : I \rightarrow \mathbb{Z}_{\geq 0}$$

WHICH COMMUTE + GIVE NATURAL ISOM FOR $d' \equiv 1$ (CF.)

OBSERVATION $\mathcal{F}_{I,W,V,d} \cong \mathcal{F}_{I,W,V,d+1}$ CANONICALLY

NOTE THESE PROPERTIES IMPLY $FR^{d'}$ IS AN ISOM

SUPPOSE $S \xrightarrow{Y} X$ IS A MAP



TECHNICAL PROBLEM FR_S MAPS DIFFERENT DISCS TO EACH

OTHER

SOLN (G.-L) $I = \{1, \dots, n\}$

$$Z_{X^n}(S) = \left\{ \begin{array}{l} \gamma_1, \dots, \gamma_n : S \rightarrow X \\ P_G^1, \dots, P_G^n \text{ on } \left(D_x \cup \bigcup_{\substack{i \in I \\ j \geq 0}} D_{\varphi^{-j}(\gamma_i)} \right) \setminus \{x\} \\ \alpha_k : P_G^k \Big|_{(D_x \cup \bigcup D_{\varphi^{-j}(\gamma_i)}) \setminus \{x, \gamma_k\}} \xrightarrow{\sim} P_G^{k+1} \\ k = 1, \dots, n-1 \\ \alpha_n (= \theta) : P_G^n \Big|_{(D_x \cup \bigcup D_{\varphi^{-j}(\gamma_i)}) \setminus \{x, \gamma_n\}} \cong \varphi_S^* P_G^1 \Big|_{\dots} \end{array} \right.$$

DISC IS REGULAR

$$\text{column } r \geq 0 \quad \left(D_x \cup D_{y_1} \cup D_{y_2} \cup \dots \cup D_{y_n} \cup D_{\varphi^{-1}(y_1)} \cup \dots \cup D_{\varphi^{-r}(y_n)} \right)$$

$$D_{x, y_1, y_2, \dots, \varphi^{-r}(y_n)}$$

DEFINE

$$\text{FR}^{\frac{1}{n}} : Z_{X^n} \longrightarrow Z_{X^n} \quad \text{BY} \quad (\text{FR}_S = \varphi_S)$$

$$\left((y_1, \dots, y_n), (P_G^1, \dots, P_G^n), (\alpha^i) \right) \longmapsto$$

$$\left((y_2, y_3, \dots, y_n, \varphi(y_1)), (P_G^2, P_G^3, \dots, P_G^n, \text{FR}_S^*(P_G^1)), \right.$$

$$\left. (\alpha^2, \alpha^3, \dots, \alpha^n, \text{FR}_S^*(\alpha^1)) \right)$$

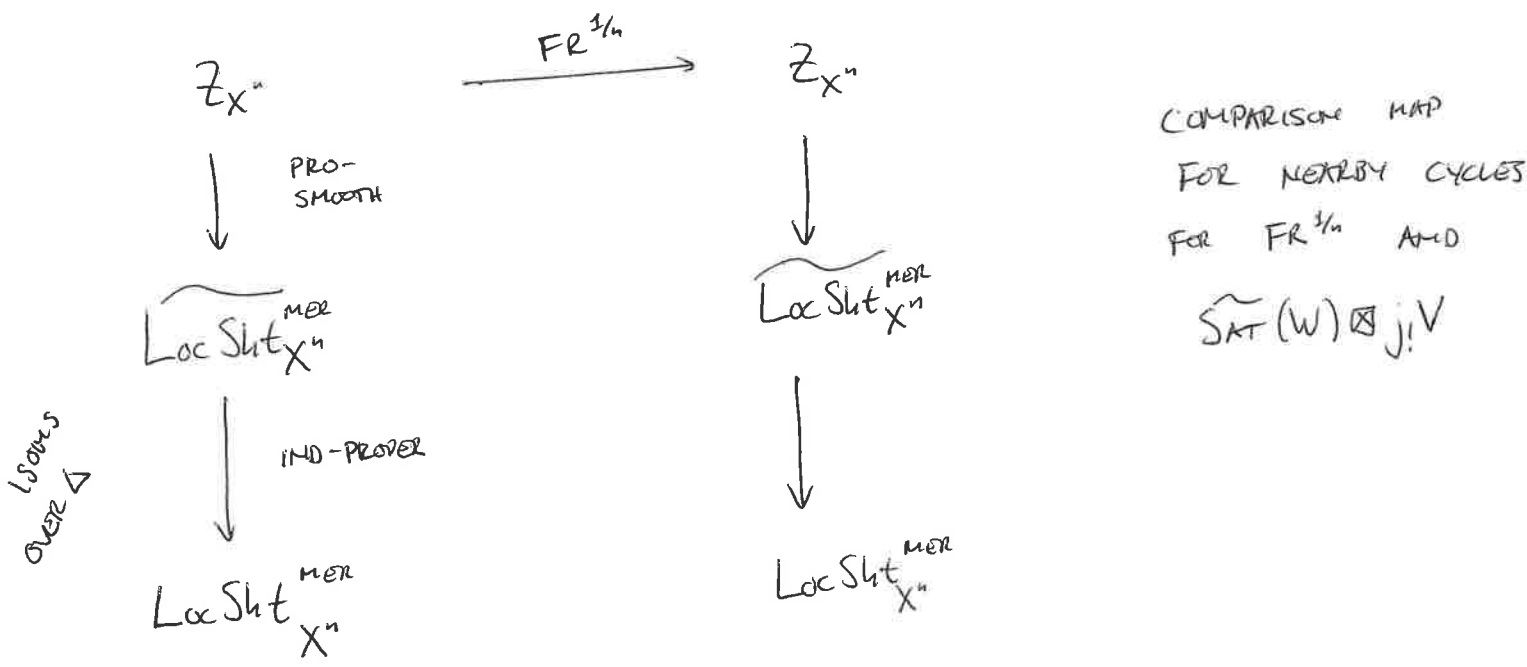
OBS 1) $(\text{FR}^{\frac{1}{n}})^n = \text{FR}_{Z_{X^n}}$

2) OVER $(x, x, \dots, x) \in X^n$, THE FIBER OF Z_{X^n} IS

Loc Sht^{MER}, AND $\text{FR}^{\frac{1}{n}} = \text{id}$ ON THIS FIBER

(N.B. NOT TRUE FOR REGULAR SHTUKAS)

$$\text{Loc Sht}_{X^n}^{\text{MER}} = \left\{ \begin{array}{l} y_1, \dots, y_n \in X \\ P_G^1, \dots, P_G^n \text{ on } D_{x, y_1, \dots, y_n} \setminus X \\ \alpha^k : P_G^k \Big|_{D_{x, y_1, y_2, \dots, y_n} \setminus \{x, y_k\}} \xrightarrow{\sim} P_G^{k+1} \Big|_{\dots} \quad k=1, \dots, n-1 \\ \alpha^n : P_G^n \Big|_{D_{x, y_1, \dots, y_n} \setminus \{x, y_n\}} \xrightarrow{\sim} \text{FR}_S^*(P_G^1) \Big|_{\dots} \end{array} \right\}$$



CYCLIC PERMUTATION ~~GROUPS~~ INCREASES THE MAP d
 \leadsto LEADS TO PARTIAL FRUB

CONSTRUCTIBILITY

CLAIM IF $V \in \text{REP}(G(K(t)))$ IS FINITELY GENERATED
 (IN ABELIAN CATEGORY) AND $W \in \text{REP}(\hat{G}^I)$ IS F.D.

THEN $\bigoplus_{I,W,V,d}$ LIES IN THE FULL SUBCAT OF
 $D(\text{LocShet}^{\text{MER}})$ GENERATED UNDER CONES + DIRECT

SUMMANDS BY OBJECTS OF THE FORM

$\pi_x^* \mathcal{E}_G$, $\pi: \text{LocShet}^{\text{REG}} \rightarrow \text{LocShet}^{\text{MER}}$ AND
 $\mathcal{E}_G \in \text{PERV}(\text{LocShet}^{\text{REG}})$

$\hat{=}$ PULLED BACK FROM A PERV SHEAF ON

$K_n = \text{KER}(L^*G \rightarrow G_n)$

$(K_n \setminus G(K(t)))^{\leq X^V} / G_n$