

**The 18th East Asian Conference on
Geometric Topology
February 6-9, 2023, Online**

hosted by Soochow University

with offline activities for part of the participants from China

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Welcome to
The 18th East Asian Conference on Geometric Topology
February 6–9, 2023 (online)

The purpose of the conference is to help promoting the academic exchange and the friendship among researchers of three East Asian countries in the area of geometric topology and encouraging graduate students of the three countries to study in this fascinating area of mathematics.

This online conference is hosted by Soochow University, with offline activities in Suzhou for part of the participants from China. It is supported by:

School of Mathematical Sciences, Soochow University, and
Grants from National Natural Science Foundation of China (NSFC)

We hope you will enjoy the conference.

Local Organizing Committee

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1 Information

The program is scheduled in **China Standard Time** (CST = UTC+8:00).

$$\mathbf{JST = KST = CST + 1:00}$$

Zoom meeting rooms: All plenary talks are given in Room 0. In the afternoon there are three parallel sessions in Room 1, Room 2 and Room 3.

The IDs and passwords of the Zoom meeting rooms are to be informed by an email in advance. Please keep them only to the participants.

Participants should display their full names in English and mute their microphones on Zoom. When you have questions or comments, you can unmute yourself to speak or write in the chat. Please refrain from recording sessions.

Speaker as the Chair for the next talk: In parallel sessions, the speaker of each talk would be kindly asked to take the chair of the next talk. The chairs of talks at 13:00 and 15:30 are acted by the meeting room coordinators.

CST Time	Speaker	Chair
13 : 00 – 13 : 25	A	a coordinator
13 : 30 – 13 : 55	B	A
14 : 05 – 13 : 30	C	B
14 : 35 – 15 : 00	D	C

CST Time	Speaker	Chair
15 : 30 – 15 : 55	E	a coordinator
16 : 00 – 16 : 25	F	E
16 : 35 – 17 : 00	G	F
17 : 05 – 17 : 30	H	G

If you would like to try to share the screen of your PC on Zoom, please tell the host of the room around 12:55 or 15:25.

Tea Time free conversations: All the Zoom meeting rooms are open during Tea Time for participants to enjoy free conversations.

Announcements during the conference: During the conference, announcements are displayed in Zoom meeting rooms or in the web-page of the conference.

2 Talk schedule

Time in the schedule is **China Standard Time** (CST = UTC+8:00).

$$\text{CST} + 1:00 = \text{JST} = \text{KST}$$

Monday, February 6

CST Time	Morning Session (Room 0)		
	Breakfast Time		
08:15–08:30	Opening Remarks		
08:30–09:20	YANG Tian	Chair: WANG Jiajun	
	Tea Time		
09:40–10:30	TANGE Motoo	Chair: GAO Hongzhu	
	Tea Time		
10:50–11:40	KANG Sungkyung	Chair: LI Youlin	
	Lunch Time		
	Afternoon Sessions		
CST Time	Room 1	Room 2	Room 3
13:00-13:25	BAIK Juhun	CHEN Haimiao	ARAI Katsunori
13:30-13:55	HASEGAWA Yo	CHENG Zhiyun	CHEN Guanheng
14:05–14:30	HIRASAWA M.	CHOI Seonmi	CHENG Zhechi
14:35–15:00	HUANG Yi	HIRAKI Moemi	DU Xiaoming
	Tea Time		
15:30–15:55	IGUCHI Daiki	ICHIHARA K.	FUKUDA Mizuki
16:00–16:25	KATADA Mai	KADOKAMI T.	GAO Yue
16:35–17:00	KIM KyeongRo	KAMADA Naoko	GE Huabin
17:05–17:30	OH Josiah	TATENO Sohei	

Zoom Meeting **Room 0** ID: 828 1746 7774 PW: 0860**

Zoom Meeting **Room 1** ID: 823 8647 5266 PW: 0860**

Zoom Meeting **Room 2** ID: 848 6147 2931 PW: 0860**

Zoom Meeting **Room 3** ID: 853 8215 1755 PW: 0860**

Time in the schedule is **China Standard Time** (CST = UTC+8:00).

$$\text{CST} + 1:00 = \text{JST} = \text{KST}$$

Tuesday, February 7

CST Time	Morning Session (Room 0)		
	Breakfast Time		
08:30–09:20	KUNO Erika	Chair: LEI Fengchun	
	Tea Time		
09:40–10:30	CHEN Lei	Chair: YU Bin	
	Tea Time		
10:50–11:40	LI Qiongling	Chair: MA Jiming	
	Lunch Time		
	Afternoon Sessions		
CST Time	Room 1	Room 2	Room 3
13:00-13:25	KIM Seonhwa	KAMADA Seiichi	GU Shijie
13:30-13:55	KOSUGE R.	KIN Unhou	HARAKO Shuichi
14:05–14:30	LIU Qing	KOSAKA Jin	KITAZAWA N.
14:35–15:00	QING Yulan	MIZUSAWA A.	LI Fengling
	Tea Time		
15:30–15:55	SHENG X.B.	NOZAKI Yuta	LI Yanlin
16:00–16:25	SUN Zhe	OH Jinseok	LIN Jianfeng
16:35–17:00	TANG Robert	PARK JungHwan	PAN Yu
17:05–17:30	WAN Renxing	TANAKA Kokoro	SEO Dongyun

Zoom Meeting **Room 0** ID: 828 1746 7774 PW: 0860**

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Wednesday, February 8

CST Time	Morning Session (Room 0)		
	Breakfast Time		
08:30–09:20	CHA Jae Choon	Chair: ZHANG Ying	
	Tea Time		
09:40–10:30	MURAO Tomo	Chair: CHA Jae Choon	
	Tea Time		
10:50–11:40	WU Xiaolei	Chair: YANG W.Y.	
	Lunch Time		
	Afternoon Sessions		
CST Time	Room 1	Room 2	Room 3
13:00–13:25	WANG Zixi	SAWABE Shun	STOIMENOV A.
13:30–13:55	XU Binbin	TADOKORO Y.	TAKAHASHI N.
14:05–14:30	XUE Yuhao	TAKANO Akihiro	WAKAMAKI Y.
14:35–15:00	YANG W.Y.	SAITO Keima	ZHANG Faze
	Tea Time		
15:30–15:55	ZHANG Qiang	TANIGUCHI Y.	YAMAGUCHI K.
16:00–16:25	ZHAO Yanxin	WADA Kodai	YASUDA Jumpei
16:35–17:00	ZHENG F.T.	XIE Yi	YOON S.B.
17:05–17:30	ZHOU Ze	VERA Anderson	YUN Hongdae

Zoom Meeting **Room 0** ID: 828 1746 7774 PW: 0860**

Zoom Meeting **Room 1** ID: 823 8647 5266 PW: 0860**

Zoom Meeting **Room 2** ID: 848 6147 2931 PW: 0860**

Zoom Meeting **Room 3** ID: 853 8215 1755 PW: 0860**

Time in the schedule is **China Standard Time** (CST = UTC+8:00).

$$\text{CST} + 1:00 = \text{JST} = \text{KST}$$

Thursday, February 9

CST Time	Morning Session (Room 0)	
	Breakfast Time	
08:30–09:20	SUN Hongbin	Chair: KOHNO Toshitake
	Tea Time	
09:40–10:30	CHOI Inhyeok	Chair: LIN Jianfeng
	Tea Time	
10:50–11:40	WANG Zhenghan	Chair: LIU Yi
	Lunch Time	

Zoom Meeting **Room 0**

ID: 828 1746 7774 PW: 0860**

3 Program

The schedule time is in **CST** (UTC + 8:00 = **JST** - 1:00 = **KST** - 1:00).

February 6, Morning (Room 0)

08:30–09:20 **YANG Tian** (Texas A & M University)

An explicit formula for the adjoint twisted Reidemeister torsion

09:40–10:30 **TANGE Motoo** (University of Tsukuba)

Scharlemann manifolds and pochette surgery

10:50–11:40 **KANG Sungkyung** (IBS Center for Geometry and Physics)

One stabilization is not enough for exotic contractible 4-manifolds

February 6, Afternoon, Room 1

13:00–13:25 **BAIK Juhun** (KAIST)

Monodromy through bifurcation locus of quadratic polynomials

13:30–13:55 **HASEGAWA Yo** (Osaka University)

Gromov boundaries of non-proper hyperbolic geodesic spaces

14:05–14:30 **HIRASAWA Mikami** (Nagoya Institute of Technology)

Stallings', Harer's and one more, last twist on fiber surfaces producing new fibered links

14:35–15:00 **HUANG Yi** (Tsinghua University)

The earthquake metric

15:30–15:55 **IGUCHI Daiki** (Hiroshima University)

Finite presentations of the mapping class groups of once-stabilized Heegaard splittings

16:00–16:25 **KATADA Mai** (Kyoto University)

Stable rational homology of the IA-automorphism groups of free groups

16:35–17:00 **KIM KyeongRo** (Seoul National University)

Revisit laminar group theory

17:05–17:30 **OH Josiah** (Fudan University)

Quasi-isometric rigidity of a product of lattices

February 6, Afternoon, Room 2

13:00–13:25 CHEN Haimiao (Beijing Technology and Business University)
Skein algebras of planar surfaces

13:30–13:55 CHENG Zhiyun (Beijing Normal University)
Region crossing change on trivalent plane graphs

14:05–14:30 CHOI Seonmi (Kyungpook National University)
The chromatic index of links

14:35–15:00 HIRAKI Moemi (Nagoya City University)
Relationships among multivariable polynomial invariants of virtual skein triples

15:30–15:55 ICHIHARA Kazuhiro (Nihon University)
Two-tone colorings and surjective dihedral representations for links

16:00–16:25 KADOKAMI Teruhisa (Kanazawa University)
The Ma-Qiu index and the Nakanishi index for a fibered knot are equal, and ω -solvability

16:35–17:00 KAMADA Naoko (Nagoya City University)
Virtual and twisted link diagrams and their sublink diagrams

17:05–17:30 TATENO Sohei (Nagoya University)
The Iwasawa Invariants of \mathbb{Z}_p^d -covers of links

February 6, Afternoon, Room 3

13:00–13:25 ARAI Katsunori (Osaka University)
An algebraic structure on the colorings for spatial surface diagrams

13:30–13:55 CHEN Guanheng (Shenzhen University)
On PFH and HF spectral invariants

14:05–14:30 CHENG Zhechi (Wuhan University)
Murasugi sum and Tau invariant

14:35–15:00 DU Xiaoming (South China University of Technology)
 \mathbb{Z}_2 -Thurston norms in Seifert manifolds

15:30–15:55 FUKUDA Mizuki (AIST, Tohoku University)
Representations of branched twist spins with a non-trivial center of order 2

16:00–16:25 GAO Yue (Anhui Normal University)
Shape of Thurston's filling systole subset in surface moduli space

16:35–17:00 GE Huabin (Renmin University of China)
On Thurston's "geometric ideal triangulation" conjecture

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February 7, Morning (Room 0)

08:30–09:20 KUNO Erika (Osaka University)

Gromov hyperbolicity of some kinds of curve graphs for nonorientable surfaces

09:40–10:30 CHEN Lei (University of Maryland)

Mapping class groups of circle bundles over a surface

10:50–11:40 LI Qionglin (Nankai University)

Harmonic metrics on Higgs bundles over non-compact surfaces

February 7, Afternoon, Room 1

13:00–13:25 KIM Seonhwa (University of Seoul)

Boundary-parabolic character variety of 8_{18} knot

13:30–13:55 KOSUGE Ryotaro (The University of Tokyo)

The rational abelianization of the Cillingworth subgroup of the mapping class group of a surface

14:05–14:30 LIU Qing (Nankai University)

Beyond hyperbolicity: Morse boundaries

14:35–15:00 QING Yulan (Fudan University)

Boundary of groups under sublinear biLipschitz equivalence

15:30–15:55 SHENG Xiaobing (The University of Tokyo)

Some obstructions on subgroups of Brin-Thompson groups

16:00–16:25 SUN Zhe (University of Science and Technology of China)

Webs on Riemann surfaces

16:35–17:00 TANG Robert (XJT Liverpool University)

Cylinder graphs for half-translation surfaces

17:05–17:30 WAN Renxing (Peking University)

Uniform exponential growth for groups with a proper product action on hyperbolic spaces

February 7, Afternoon, Room 2

13:00–13:25 KAMADA Seiichi (Osaka University)

On braid presentation of twisted links

13:30–13:55 KIN Unhou (Nagoya City University)

Goeritz matrices of twisted link

14:05–14:30 KOSAKA Jin (Osaka University)

On generalized Alexander quandles of finite groups

14:35–15:00 MIZUSAWA Atsuhiko (Waseda University)

A classification of the link-homotopy classes of 5-component links

15:30–15:55 NOZAKI Yuta (Hiroshima University)

A non-commutative Reidemeister–Turaev torsion of homology cylinders

16:00–16:25 OH Jinseok (Kyungpook National University)

On set-theoretic Yang-Baxter cohomology of Alexander biquandles

16:35–17:00 PARK JungHwan (KAIST)

The $(2, 1)$ -cable of the figure-eight knot is not smoothly slice

17:05–17:30 TANAKA Kokoro (Tokyo Gakugai University)

The universal covering of a knot n -quandle

February 7, Afternoon, Room 3

13:00–13:25 GU Shijie (Northeastern University)

On the nonembeddability of contractible open manifolds

13:30–13:55 HARAKO Shuichi (The University of Tokyo)

Graded manifolds whose functions are almost commutative

14:05–14:30 KITAZAWA Naoki (Kyushu University)

Graph manifolds and round fold maps on them into the plane

14:35–15:00 LI Fengling (Dalian University of Technology)

On H' -splittings of Seifert manifolds

15:30–15:55 LI Yanlin (Hangzhou Normal University)

Topological and geometrical properties of singular submanifolds

16:00–16:25 LIN Jianfeng (Tsinghua University)

Homological instability for the moduli space of smooth 4-manifolds

16:35–17:00 PAN Yu (Tianjin University)

Augmentations and exact Lagrangian surfaces

17:05–17:30 SEO Dongyun (Seoul National University)

RAAG subgroups of MCGs

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February 8, Morning (Room 0)

08:30–09:20 **CHA Jae Choon** (POSTECH)

Smoothing topological surfaces in smooth 4-manifolds

09:40–10:30 **MURAO Tomo** (Kochi University)

Multiple group rack cocycle invariants of spatial surfaces

10:50–11:40 **WU Xiaolei** (Fudan University)

On the homology of big mapping class groups

February 8, Afternoon, Room 1

13:00–13:25 **WANG Zixi** (Zhejiang Normal University)

Profinite rigidity in 4-dimensional Seifert manifolds

13:30–13:55 **XU Binbin** (Nankai University)

Equivalent curves on surfaces

14:05–14:30 **XUE Yuhao** (Tsinghua University)

Separating systole for random hyperbolic surfaces of Weil–Petersson model

14:35–15:00 **YANG Wenyuan** (Peking University)

Cogrowth of divergent groups with contracting elements

15:30–15:55 **ZHANG Qiang** (Xi'an Jiaotong University)

Explicit bounds for fixed subgroups of endomorphisms of free products

16:00–16:25 **ZHAO Yanxin** (XJT Liverpool University)

Some properties of the group of quasi-isometries of the real line

16:35–17:00 **ZHENG Fangting** (XJT Liverpool University)

Hyperbolic reflection groups

17:05–17:30 **ZHOU Ze** (Shenzhen University)

Polygons inscribed in Jordan curves with prescribed edge ratios

February 8, Afternoon, Room 2

13:00–13:25 SAWABE Shun (Waseda University)

On the potential function of the colored Jones polynomial with arbitrary colors

13:30–13:55 TADOKORO Yuuki (National Inst. of Tech., Kisarazu College)

Minimal generating sets of groups of Kim–Manturov

14:05–14:30 TAKANO Akihiro (The University of Tokyo)

Virtual Thompson’s group

14:35–15:00 SAITO Keima (Kobe University)

No 2-knot has the regular triple point number four

15:30–15:55 TANIGUCHI Yuta (Osaka University)

Knot quandles and knot groups for 2-knots

16:00–16:25 WADA Kodai (Kobe University)

Characterization of welded links with generalized Brunnian properties

16:35–17:00 XIE Yi (Peking University)

Instanton homology and knot detection on thickened surfaces

17:05–17:30 VERA Anderson (IBS Center for Geometry and Physics)

Double lower central series and a double Johnson filtration for the Goeritz group of the sphere

February 8, Afternoon, Room 3

13:00–13:25 STOIMENOV Alexander (KAIST)

Strong quasipositivity of links

13:30–13:55 TAKAHASHI Natsuya (Osaka University)

Trisection genus of corks

14:05–14:30 WAKAMAKI Yohei (Osaka university)

A cork of the rational surface with second Betti number 9

14:35–15:00 ZHANG Faze (Northeast Normal University)

The surface complex

15:30–15:55 YAMAGUCHI Kouki (Kyoto University)

The 3-loop polynomial of knots obtained by plumbing the doubles of two knots

16:00–16:25 YASUDA Jumpei (Osaka University)

A note on the plat index for surface-knots

16:35–17:00 YOON Seok Beom (Southern University of Science and Technology)

Twisted Neumann–Zagier matrices and loop invariants

17:05–17:30 YUN Hongdae (Kyungpook National University)

Geometric realization of the extreme Khovanov homology of pretzel links

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February 9, Morning (Room 0)

08:30–09:20 **SUN Hongbin** (Rutgers University)

Virtual domination of 3-manifolds

09:40–10:30 **CHOI Inhyeok** (KAIST)

Asymmetry of a generic outer automorphism of a free group

10:50–11:40 **WANG Zhenghan** (University of California Santa Barbara)

From 3-manifolds to $(2 + 1)$ -TQFTs

4 Abstracts

4.1 Plenary talks

CHA Jae Choon (POSTECH)

Smoothing topological surfaces in smooth 4-manifolds

ABSTRACT: In 4-dimensional topology, known differences between the smooth and topological categories can be understood as a failure of smoothing embedded topological disks. Modern smooth techniques detect a surprisingly large extent of the failure of disk smoothing, but little was known about when topological disks are smoothable. I will talk about new smoothing techniques for topologically embedded surfaces in smooth 4-manifolds. As applications, we prove “topological = smooth” results in dimension 4 for isotopy classifications of certain disks and spheres. The main results are joint with Byeorhi Kim.

CHEN Lei (University of Maryland)

Mapping class groups of circle bundles over a surface

ABSTRACT: In this talk, we study the algebraic structure of mapping class group $\text{Mod}(M)$ of 3-manifolds M that fiber as a circle bundle over a surface $S^1 \rightarrow M \rightarrow S_g$. We prove an exact sequence $1 \rightarrow H^1(S_g) \rightarrow \text{Mod}(M) \rightarrow \text{Mod}(S_g) \rightarrow 1$, relate this to the Birman exact sequence, and determine when this sequence splits.

CHOI Inhyeok (KAIST)

Asymmetry of a generic outer automorphism of a free group

ABSTRACT: The outer automorphism group of a free group is an analogue of the mapping class group of a surface. In mapping class groups and outer automorphism groups, the most complicated dynamics are exhibited by pseudo-Anosov mapping classes and fully irreducible outer automorphisms. The dynamics of pseudo-Anosovs (fully irreducibles, respectively) are associated with a quantity called the stretch factor (expansion factor, respectively). Although a pseudo-Anosov mapping class and its inverse always have the same stretch factor, Handel and Mosher showed that certain fully irreducible outer automorphisms and their inverses have different expansion factors. In this talk, I will explain that this asymmetry is generic in the outer automorphism group of free groups with rank at least 3.

KANG Sungkyung (IBS Center for Geometry and Physics)

One stabilization is not enough for exotic contractible 4-manifolds

ABSTRACT: We give the first example of an exotic structure on a contractible 4-manifold, where the exoticness persists after one stabilization.

KUNO Erika (Osaka University)

Gromov hyperbolicity of some kinds of curve graphs for nonorientable surfaces

ABSTRACT: Curve graphs are often used to study mapping class groups of surfaces. A full subgraph of a curve graph that consists of all vertices represented by the nonseparating curves is called the nonseparating curve graph. After Masur–Minsky in 1999 proved that the curve graphs of orientable surfaces are Gromov hyperbolic, various studies about the Gromov hyperbolicity for curve graphs have progressed. In 2020, Rasmussen proved that the nonseparating curve graph of any finite type orientable surface is Gromov hyperbolic with a hyperbolicity constant which is independent of the topological types of the orientable surfaces. We generalize the result by Rasmussen to nonorientable surfaces. In this talk, we would like to focus on differences from the case of orientable surfaces. Moreover, if the time permits we will treat an application: Gromov hyperbolicity of fine curve graphs for nonorientable surfaces, which is a joint work with Mitsuaki Kimura.

LI Qiongling (Nankai University)

Harmonic metrics on Higgs bundles over non-compact surfaces

ABSTRACT: For a Higgs bundle over a compact Riemann surface, the Hitchin–Kobayashi correspondence says the existence of a harmonic metric is equivalent to the polystability of the Higgs bundle. Moreover, the harmonic metric is unique if the Higgs bundle is stable. In this talk, we discuss some recent progress on the existence and uniqueness of harmonic metrics on Higgs bundles over general non-compact Riemann surfaces. This is joint work with Takuro Mochizuki (Tokyo University).

MURAO Tomo (Kochi University)

Multiple group rack cocycle invariants of spatial surfaces

ABSTRACT: A spatial surface is a compact surface embedded in the 3-sphere. If it has a boundary, the spatial surface is a Seifert surface of the link given by the boundary. A spatial surface without boundary is closely related to handlebody-knots, which is a handlebody embedded in the 3-sphere. A multiple group rack is an algebraic system whose axioms are derived from Reidemeister moves of oriented spatial surfaces. In this talk, we introduce a multiple group rack cocycle invariant of oriented spatial surfaces and provide some calculation examples.

SUN Hongbin (Rutgers University)

Virtual domination of 3-manifolds

ABSTRACT: In this talk, we survey known results on virtual domination of 3-manifolds, i.e. a 3-manifold has a finite cover that admits a non-zero degree to another 3-manifold. We have proved a sequence of results on this topic, in which the domains are closed hyperbolic 3-manifold, closed 3-manifold with positive simplicial volume, cusped hyperbolic 3-manifolds, respectively. The good pants construction initiated by Kahn and Markovic is a crucial tool for all proofs of these results.

TANGE Motoo (University of Tsukuba)

Scharlemann manifolds and pchette surgery

ABSTRACT: Scharlemann defined a surgery of the product $\Sigma \times S^1$ for a homology 3-sphere Σ in such a way that the fundamental group of Σ is vanished. The result is homotopy equivalent to $S^3 \times S^1 \# S^2 \times S^2$ or $S^3 \times S^1 \# CP^2 \# (-CP^2)$ if Σ is a Dehn surgery of a knot in S^3 . We call such a manifold a Scharlemann manifold. In this talk, we show any Scharlemann manifold is a result of pchette surgery or outer surgery of S^4 with slope 0 with non-trivial cord.

WANG Zhenghan (University of California Santa Barbara)

From 3-manifolds to $(2 + 1)$ -TQFTs

ABSTRACT: Physics suggested an incredible possibility that each closed 3-manifold could lead to a modular tensor category (MTC), which is essentially a $(2 + 1)$ -TQFT. The modular data of the resulting MTC comes from non-abelian torsions and Chern–Smions invariants of the 3-manifold. So far this program works only for non-hyperbolic 3-manifolds. I will explain this mathematical program, based on a joint work with S. Cui and Y. Qiu.

WU Xiaolei (Fudan University)

On the homology of big mapping class groups

ABSTRACT: I will start slowly with basic notions on homology of groups. Then I will give a review on the calculations of homology of mapping class groups for finite type surfaces. After that I will discuss what is the story in the case of infinite type surfaces. In particular, I will discuss how one can calculate the homology of mapping class groups for some well-know surfaces, including disk minus Cantor set. This is based on joint works with Martin Palmer.

YANG Tian (Texas A & M University)

An explicit formula for the adjoint twisted Reidemeister torsion

ABSTRACT: In this talk, I will present an explicit formula we found for the Reidemeister torsion of a closed oriented hyperbolic 3-manifold twisted by the adjoint action of the holonomy representation of the fundamental group of the manifold. This is to the best of our knowledge the first known explicit formula for such quantity. In the formula, we consider the manifolds as obtained by doing hyperbolic Dehn fillings along a universal family of cusped hyperbolic 3-manifolds known as the fundamental shadow links, and the torsion is expressed in terms of the logarithmic holonomy of the meridians of the fundamental shadow links. This is a joint work with Ka Ho Wong.

4.2 Parallel sessions

ARAI Katsunori (Osaka University)

An algebraic structure on the colorings for spatial surface diagrams

ABSTRACT: A rack is a set with a binary operation satisfying two conditions corresponding to two of the Reidemeister moves in knot theory. We introduce the notion of a groupoid rack, which has a mixed structure of a groupoid and a rack. It is used for coloring a diagram of a spatial surface, which is a compact oriented surface with boundary embedded in the 3-sphere. In this talk, we construct invariants of spatial surfaces using groupoid racks. Our invariants include both of the invariants using multiple group racks and the invariants using heap racks.

BAIK Juhun (KAIST)

Monodromy through bifurcation locus of quadratic polynomials

ABSTRACT: The shift locus of degree d polynomial is a space of complex polynomials of degree d , whose every critical point escape to infinity under iteration. Also, the polynomial is in the bifurcation locus if it admits a root of unity as a multiplier. Blanchard, Devaney and Keen proved that the fundamental group of shift locus of degree d maps surjectively to the shift automorphism of one-sided sequence of d symbols. The simplest case is the quadratic and its shift locus is exterior of Mandelbrot set, which is holomorphic to an annulus and therefore its fundamental group is an infinite cyclic group. In this talk we discuss what action take place on the one-sided sequence of 2 symbols if the parameter moves along the bifurcation locus. It is a joint work with prof. Harry Hyungryul Baik.

CHEN Guanheng (Shenzhen University)

On PFH and HF spectral invariants

ABSTRACT: Periodic Floer homology (PFH) and quantitative Heegaard Floer homology (QHF) are respectively Floer type invariants for symplectomorphisms on surfaces. A sequence of real numbers can be extracted from these two homological theories called spectral invariants. In my talk, I will focus on the special case that the symplectomorphisms are Hamiltonian. I will present results on the relation between these two kinds of spectral invariants.

CHEN Haimiao (Beijing Technology and Business University)

Skein algebras of planar surfaces

ABSTRACT: We give a presentation for the Kauffman bracket skein algebra of each orientable surface of genus 0. The result is a quantization of the structure of the trace algebra of 2×2 unimodular matrices.

CHENG Zhechi (Wuhan University)

Murasugi sum and Tau invariant

ABSTRACT: The Murasugi sum is a link operation that generalizes the connected sum. The tau invariant is a link invariant from knot Floer homology that bounds the genus from below, where the equality $\tau = g$ holds for a large class of links with all

strongly quasi-positive links included. In this talk, we show that the equation $\tau = g$ holds for the Murasugi sum of two links if and only if it holds for both summands. This is joint work with Matthew Hedden and Sucharit Sarkar.

CHENG Zhiyun (Beijing Normal University)

Region crossing change on trivalent plane graphs

ABSTRACT: Region crossing change is a local operation on link diagrams. In this talk, I will explain the effect of region crossing change on trivalent plane graphs. In particular, a necessary and sufficient condition will be given for triangulating the two sphere with exactly two odd vertices.

CHOI Seonmi (Kyungpook National University)

The chromatic index of links

ABSTRACT: A quandle is an algebraic structure related to Reidemeister moves in knot theory. The set of links is divided into two classes by the colorability for a given quandle. The colorable knots can be studied by various quandle invariants; the number of colorings, quandle cocycle invariants, etc. However, there are no particular methods for studying non-colorable knots at the moment. In this talk, we will introduce a new invariant, called the chromatic index of links, which is designed for studying non-colorable knots. We will also show the relationship between the chromatic index and the other known knot invariants; crossing number, braid index and bridge number, etc. This is joint work with Yongju Bae and Byeorhi Kim.

DU Xiaoming (South China University of Technology)

\mathbb{Z}_2 -Thurston norms in Seifert manifolds

ABSTRACT: Given a manifold M and an element $c \in H_2(M; \mathbb{Z}_2)$, the \mathbb{Z}_2 -Thurston norm of c is related to the minimal genus of the non-orientable surfaces representing the homology class c . The norms of all of the elements in the \mathbb{Z}_2 -homology group can produce a lower bound of the complexity of M , i.e., the number of tetrahedra necessary to triangulate M . In this talk, for every orientable Seifert manifold M with an orientable orbit space, we give a general method to compute the \mathbb{Z}_2 -Thurston norms of all the elements in $H_2(M; \mathbb{Z}_2)$.

FUKUDA Mizuki (AIST, Tohoku University)

Representations of branched twist spins with a non-trivial center of order 2

ABSTRACT: A 2-knot is an embedded 2-sphere in the 4-sphere and a branched twist spin is known as a 2-knot constructed from a 1-knot and a circle action on the 4-sphere. One of important information about the branched twist spin is that its knot group except some case has a non-trivial center. In this talk, by using property, we consider the numbers of $SL_2(\mathbb{C})$ - and dihedral- representations and give a sufficient condition to distinguish branched twist spins.

GAO Yue (Anhui Normal University)

Shape of Thurston's filling systole subset in surface moduli space

ABSTRACT: In this talk, I will talk about the sparseness of Thurston's subset. Sparseness is a geometric concept on Thurston's subset firstly raised by Anderson-Parlier-Pettet in 2016. We have proved the sparseness of Thurston's subset in the sense of Teichmüller distance and Weil-Petersson distance. More precisely, most surfaces in genus g surface moduli space have Teichmüller distance $\frac{1}{5} \log \log g$ and Weil-Petersson distance $0.6521(\sqrt{\log g} - \sqrt{7 \log \log g})$ to the Thurston's subset.

GE Huabin (Renmin University of China)

On Thurston's "geometric ideal triangulation" conjecture

ABSTRACT: Using combinatorial Ricci flow methods, we shall prove the following theorem: Let M be a compact 3-manifold with boundary consisting of surfaces of genus at least 2. If M admits an ideal triangulation with valence at least 10 at all edges, then there exists a unique hyperbolic metric on M with totally geodesic boundary under which the ideal triangulation is geometric. For a special class of 3-manifolds, the theorem affirms a folklore conjecture which exists for almost 40 years under not so strong assumptions. This is based on joint work with Ke Feng and Bobo Hua.

GU Shijie (Northeastern University, China)

On the nonembeddability of contractible open manifolds

ABSTRACT: By Haken's finiteness theorem, one can easily construct infinitely many contractible open 3-manifolds (up to homeomorphism) which embed in no compact 3-manifold. But can these manifolds embed in a more general compact 3-space, say, a compact, locally connected and locally 1-connected metric 3-space X ? For some exotic contractible open 3-manifolds, the answer is negative. We will introduce such examples and show that the nonembeddable phenomenon also exists in higher dimensions. If time permits, we shall discuss some ideas towards a full characterization of embeddable contractible open manifolds in X .

HARAKO Shuichi (The University of Tokyo)

Graded manifolds whose functions are almost commutative

ABSTRACT: In terms of locally ringed spaces, smooth manifolds are characterized by the algebras consisting of local smooth functions and how to glue them chart by chart. One method of defining supermanifolds is to replace the sheaf of functions on a smooth manifold by the ones of a super-commutative algebra. Meanwhile, as a generalization of a super-commutative algebra, we have a rho-commutative algebra, or an almost commutative algebra, which is an algebra graded by an arbitrary abelian group, and whose commutativity is determined by a commutation factor. In this talk, we introduce a rho-manifold, which is a locally ringed space whose functions are rho-commutative, and discuss the property of the modular class of Q -manifolds in this version.

HASEGAWA Yo (Osaka University)

Gromov boundaries of non-proper hyperbolic geodesic spaces

ABSTRACT: In a proper hyperbolic geodesic space, it is well known that the sequen-

tial boundary can be identified as topological spaces with the geodesic boundary. We show that in a (not necessarily proper) hyperbolic geodesic space, the sequential boundary can be identified as topological spaces with the quasi-geodesic boundary.

HIRAKI Moemi (Nagoya City University)

Relationships among multivariable polynomial invariants of virtual skein triples

ABSTRACT: The virtualized skein relation for the Jones polynomial of virtual link diagrams was studied by N. Kamada, S. Nakabo, and S. Satoh if one of diagrams in a virtual skein triple is checkerboard colorable. Also different virtualized skein relation for the Jones polynomial were studied by N. Kamada. On the other hand, H. A. Dye, L. H. Kauffman, and Y. Miyazawa introduced a multivariable polynomial invariant of virtual links, which is a refinement of Jones polynomial. In this talk, we discuss relationships for the multivariable polynomial invariants of virtual skein triples.

HIRASAWA Mikami (Nagoya Institute of Technology)

Stallings', Harer's and one more, last twist on fiber surfaces producing new fibered links

ABSTRACT: Let L be a fibered link in S^3 , with fiber surface F . Let ℓ be a loop embedded in F which is unknotted in S^3 . Then a twisting operation along ℓ sometimes gives a new fibered pair (L', F') in S^3 . J. Stallings was the first to find such a twisting (which is now called a Stallings twist). Later, J. Harer found another twisting (which is now called a Harer twist). In this paper, we give one more such twisting, and also show that there can be no more new such twisting. Among a plenty of examples of such twistings, we also shed a new light on so-called generalized Hopf plumbings. This is a joint work with Cam Van Quach Hongler (University of Geneva).

HUANG Yi (Tsinghua University)

The earthquake metric

ABSTRACT: Earthquakes are natural generalisations of Fenchel-Nielsen twists deformations, and Thurston's remarkable earthquake theorem asserts that any hyperbolic metric on a given closed surface can be deformed to any other by a unique (left) earthquake. This was famously employed by Kerckhoff in his proof of the Nielsen realisation problem, which quickly cemented their importance in Teichmüller theory. Geometrically speaking, however, (long) Earthquake paths are far from being "twist-efficient"; indeed, Mirzakhani shows that earthquake flows on Teichmüller space are measure conjugate to the horocyclic flow. Motivated by wishing to understand how one might efficiently "earthquake" between hyperbolic structures, we initiate the first systematic study of the earthquake metric—a Finsler metric first introduced in Thurston's "Minimal stretch maps between hyperbolic surfaces" preprint. This is work in collaboration with K. Ohshika, H. Pan and A. Papadopoulos.

ICHIHARA Kazuhiro (Nihon University)

Two-tone colorings and surjective dihedral representations for links

ABSTRACT: It is well-known that a knot group admits a surjective homomorphism to the dihedral group of degree n if and only if the knot is Fox n -colorable. However, it is not true for links with two or more components. In this talk, I introduce a two-tone coloring on a link diagram, and give a condition for links that the link groups admit surjective representations to dihedral groups.

IGUCHI Daiki (Hiroshima University)

Finite presentations of the mapping class groups of once-stabilized Heegaard splittings

ABSTRACT: The mapping class group of a Heegaard splitting of a 3-manifold is the group of isotopy classes of diffeomorphisms of the manifold that preserve the splitting. We show that if a Heegaard splitting is a once stabilization of a sufficiently high distance Heegaard splitting, then its mapping class group is finitely presented.

KADOKAMI Teruhisa (Kanazawa University)

The Ma-Qiu index and the Nakanishi index for a fibered knot are equal, and ω -solvability

ABSTRACT: For a knot K in S^3 , let $G(K)$ be the knot group of K , $a(K)$ the Ma-Qiu index (the MQ index, for short), which is the minimal number of normal generators of the commutator subgroup of $G(K)$, and $m(K)$ the Nakanishi index of K , which is the minimal number of generators of the Alexander module of K . We generalize the notions for a pair of a group G and its normal subgroup N , and we denote them by $a(G, N)$ and $m(G, N)$ respectively. Then it is easy to see $m(G, N) \leq a(G, N)$ in general. We also introduce a notion “ ω -solvability” for a group that the intersection of all higher commutator subgroups is trivial. Our main theorem is that if N is ω -solvable, then we have $m(G, N) = a(G, N)$. As corollaries, for a fibered knot K , we have $m(K) = a(K)$, and we could determine the MQ indices of prime knots up to 9 crossings completely.

KAMADA Naoko (Nagoya City University)

Virtual and twisted link diagrams and their sublink diagrams

ABSTRACT: G. T. Jin and J. H. Lee proved the following: Suppose that D_1, \dots, D_n are link diagrams. Given a link L which is partitioned into sublinks L_1, \dots, L_n admitting diagrams D_1, \dots, D_n respectively, there is a diagram D of L whose restrictions to L_1, \dots, L_n are isotopic to D_1, \dots, D_n , respectively. In this talk we give an analogy of this result for welded links. Furthermore we discuss similar issues for virtual links and twisted links.

KAMADA Seiichi (Osaka University)

On braid presentation of twisted links

ABSTRACT: Twisted links are defined by using link diagrams on a plane possibly with virtual crossings and bars modulo a generalization of Reidemeister moves, and they correspond to stable equivalence classes of link in oriented thickenings of surfaces. We discuss Alexander and Markov theorem on twisted links. We also discuss a group presentation for the twisted virtual braid groups. This is a joint work with

Madeti Prabhakar and Komal Negi.

KATADA Mai (Kyoto University)

Stable rational homology of the IA-automorphism groups of free groups

ABSTRACT: The IA-automorphism group IA_n of the free group F_n is a normal subgroup of the automorphism group of F_n , which is an analogue of the Torelli groups of surfaces with one boundary component. It is difficult to determine the rational homology of IA_n in degree greater than one. In this talk, we consider the Albanese homology of IA_n , that is, the image of the map induced by the abelianization map of IA_n . In a stable range, we obtain a subquotient of the Albanese homology of IA_n , which is conjecturally equal to the entire Albanese homology of IA_n .

KIM KyeongRo (Seoul National University)

Revisit laminar group theory

ABSTRACT: A laminar group is a subgroup of orientation preserving circle homeomorphisms preserving circle laminations. Laminar group theory is motivated by Thurston's universal circle theorem. The theorem says that a tautly foliated three manifold group acts on the (universal) circle preserving a pair of circle laminations. Laminar group theory studies the converse of this theorem. In this talk, I will introduce some basic notions and recent progress. This work is joint with Hyungryul Baik and Hongtaek Jung.

KIM Seonhwa (University of Seoul)

Boundary-parabolic character variety of 8_{18} knot

ABSTRACT: A boundary-parabolic representation of knot K is a $SL(2, \mathbb{C})$ representation of $\pi_1(S^3 \setminus K)$ where the trace image of peripheral subgroup is ± 2 . We call the set of such conjugacy classes boundary-parabolic character variety. The knot 8_{18} is the most complicated one among the knots up to 8 crossings in the sense of character variety. The whole structure of the $SL(2, \mathbb{C})$ character variety including not only geometrical components but also all other components, is not known until now, even in the boundary-parabolic case. In this talk, we discuss how to overcome the computational difficulty to obtain all boundary-parabolic representations and confirm the complete list of boundary parabolic representations with an aid of Gröbner basis algorithm. There are 26 boundary-parabolic representations up to conjugation. In particular, it turns out that there are only 12 equivalence classes by 8_{18} 's symmetry and completely classified by the complex volume.

KIN Unhou (Nagoya City University)

Goeritz matrices of twisted link

ABSTRACT: Twisted knot theory is an extension of virtual knot theory. Pseudo Goeritz matrices are defined for virtual knot diagrams. Torsion invariants of pseudo Goeritz matrices are invariants for virtual knots. In this talk we discuss pseudo Goeritz matrices of twisted knots and their applications.

KITAZAWA Naoki (Kyushu University)

Graph manifolds and round fold maps on them into the plane

ABSTRACT: Graph manifolds form an important class of 3-dimensional closed and orientable manifolds as Neumann has shown for example. They are manifolds obtained by gluing circle bundles over compact surfaces along the boundaries.

This talk is on studies of the speaker on explicit fold maps or round fold maps into the plane on graph manifolds. A fold map is a smooth map locally represented as the product map of a Morse function and the identity map on some disk around each singular point. Fold maps have been playing important roles in algebraic topology and differential topology of manifold as Morse functions. Round fold maps, introduced by the speaker in the 2010s, are fold maps such that the sets of all singular values are concentric spheres. This talk concerns mainly on the following.

N. Kitazawa, Round fold maps on 3-dimensional manifolds and their integral and rational cohomology rings, arXiv:2301.07008.

N. Kitazawa and O. Saeki, Round fold maps on 3-manifolds, to appear in Algebraic & Geometric Topology, arXiv:2105.00974.

KOSAKA Jin (Osaka University)

On generalized Alexander quandles of finite groups

ABSTRACT: Due to D. Joyce, for a given group and an automorphism of it, a quandle is constructed, which we call a generalized Alexander quandle. Recently A. Higashitani and H. Kurihara has studied generalized Alexander quandles of finite groups. They classified all of those quandles arising from groups with their order up to 15, and they asserted that they classified those with their order up to 16 except a pair of quandles. We show that the exceptional pair of quandles are actually isomorphic.

KOSUGE Ryotaro (The University of Tokyo)

The rational abelianization of the Cillingworth subgroup of the mapping class group of a surface

ABSTRACT: The Chillingworth subgroup of the mapping class group is a subgroup defined as a subgroup whose action on the set of homotopy classes of nonsingular vector fields is trivial. I compute the rational abelianization of the Chillingworth subgroup as full mapping class group modules and given by the first Johnson homomorphism and the Casson-Morita homomorphism (map). I also determine the kernel of the Casson-Morita homomorphism on the Chillingworth subgroup.

LI Fengling (Dalian University of Technology)

On H' -splittings of Seifert manifolds

ABSTRACT: In this talk, we introduce the H' -splittings for compact connected orientable 3-manifolds, and describe a characteristic of some H' -splittings to denote a Seifert 3-manifold with boundary. This is joint work with Yan Xu and Fengchun Lei.

LI Yanlin (Hangzhou Normal University)

Topological and geometrical properties of singular submanifolds

ABSTRACT: Singular submanifolds are produced in physics, mechanics, and other application fields and are the breakthrough point to discovering new problems. Therefore, it is of great scientific significance to study the geometric and topological properties of the singular submanifolds. However, the traditional analysis and geometric mathematical tools are no longer applicable due to the existence of singular sets, making the study of singular submanifolds difficult. Combining singularity theory and envelope theory to study the geometric and topological properties of singular submanifold is a new attempt. The singular manifold is regarded as an envelope from the viewpoint of envelope theory, and the properties of singular submanifolds are studied by using the singularity theory. In this talk, I will present recent advances in studying topological and geometrical properties of some classical geometric objects from the geometric viewpoint, singularity theory viewpoint, and envelope theory viewpoint.

LIN Jianfeng (Tsinghua University)

Homological instability for the moduli space of smooth 4-manifolds

ABSTRACT: The moduli space of a smooth manifold X is defined to be the classifying space of its diffeomorphism group. Understanding the cohomology group of this space is important because elements in this group one-to-one correspond to characteristic classes for smooth bundles with fiber X . A celebrated result of Harer states that homology groups of the moduli spaces of Riemann surfaces stabilize if one fixes a degree and increases the genus. Galatius and Randal-Williams established analogous homological stability for moduli spaces of manifolds of even dimension at least 6. In this talk, we will show that homological stability fails for the moduli space of any simply-connected closed smooth 4-manifold in any degree of homology. The central tool is a characteristic class constructed using Seiberg–Witten equations, which detects the subtle difference between the topological category and the smooth category of 4-manifolds. This is a joint work with Hokuto Konno.

LIU Qing (Nankai University)

Beyond hyperbolicity: Morse boundaries

ABSTRACT: The Morse boundary of a proper geodesic metric space is a generalization of the Gromov boundary of a hyperbolic space. It is a quasi-isometry invariant to study “hyperbolic directions” in the space. That is, a quasi-isometry between two spaces induces a homeomorphism on their Morse boundaries. This homeomorphism satisfies a variety of metric properties including bi-Hölder, quasi-conformal, quasi-Möbius and power quasisymmetric. In this talk, we will give a brief introduction about Morse boundaries and investigate these structures on the Morse boundary which determine the interior space up to a quasi-isometry.

MIZUSAWA Atsuhiko (Waseda University)

A classification of the link-homotopy classes of 5-component links

ABSTRACT: Habegger and Lin showed that the link-homotopy classes of links are

obtained from those of string-links modulo the actions of the conjugations and the partial conjugations for string-links. After that Hughes showed that the conjugations are generated by the partial conjugations. In this talk, we calculate the action of the partial conjugations for 5-component string-links and give a classification (a presentation) of the link-homotopy classes of 5-component links. As an application, we can run Habegger and Lin's algorithm which determines whether given two links are link-homotopic or not for 5-component links. This is a joint work with Yuka Kotorii (Hiroshima University/RIKEN).

NOZAKI Yuta (Hiroshima University)

A non-commutative Reidemeister-Turaev torsion of homology cylinders

ABSTRACT: We compute the Reidemeister-Turaev torsion of homology cylinders which takes values in the K_1 -group of the I -adic completion of the group ring $\mathbb{Q}\pi_1\Sigma_{g,1}$, and prove that its reduction to $\widehat{\mathbb{Q}\pi_1\Sigma_{g,1}}/\hat{I}^{d+1}$ is a finite-type invariant of degree d . We also show that the 1-loop part of the LMO homomorphism and the Enomoto-Satoh trace are written by the leading term of our torsion. This is joint work with Masatoshi Sato and Masaaki Suzuki.

OH Jinseok (Kyungpook National University)

On set-theoretic Yang-Baxter cohomology of Alexander biquandles

ABSTRACT: A homology theory of set-theoretic Yang-Baxter operators was established by J. S. Carter, M. Elhamdadi, and M. Saito. It was generalized for pre-Yang-Baxter operators independently by V. Lebedev and J. H. Przytycki. Biquandles, a generalization of quandles, are special cases of set-theoretic Yang-Baxter operators. In this talk, we determine upper and lower bounds of the Betti numbers for the set-theoretic Yang-Baxter (co)homology of finite Alexander biquandles. This is joint work with Seung Yeop Yang and Hongdae Yun.

OH Josiah (Fudan University)

Quasi-isometric rigidity of a product of lattices

ABSTRACT: As a contribution to Gromov's program of classifying finitely generated groups up to quasi-isometry, we give an algebraic description of those finitely generated groups which are quasi-isometric to $L \times N$, where L is a non-uniform lattice in a rank one semisimple Lie group and N is a lattice in a simply connected nilpotent Lie group. Such a group is, up to finite noise, an extension by a nilpotent lattice of a non-uniform lattice commensurable to L .

PAN Yu (Tianjin University)

Augmentations and exact Lagrangian surfaces

ABSTRACT: Exact Lagrangian surfaces are important objects in the derived Fukaya category. Augmentations are objects of the augmentation category, which is the contact analog of the Fukaya category. In this talk, we discuss various relations between augmentations and exact Lagrangian surfaces. In particular, we realize augmentations, which is an algebraic object, fully geometrically via exact Lagrangian surfaces.

PARK JungHwan (KAIST)

The (2,1)-cable of the figure-eight knot is not smoothly slice

ABSTRACT: We prove that the (2,1)-cable of the figure-eight knot is not smoothly slice by showing that its branched double cover bounds no equivariant homology ball. This answers a forty-year-old question posed by Kawachi. This is joint work with Irving Dai, Sungkyung Kang, Abhishek Mallick, and Matthew Stoffregen.

QING Yulan (Fudan University)

Boundary of groups under sublinear biLipschitz equivalence

ABSTRACT: A sublinearly biLipschitz equivalence (SBE) between metric spaces is a map from one space to another that distorts distances with bounded multiplicative constants and sublinear additive error. Sublinear Morse boundaries are defined for all geodesic proper metric spaces as a quasi-isometrically invariant and metrizable topological set of quasi-geodesic rays. In this paper, we prove that the sublinearly Morse boundary of proper geodesic metric spaces are invariant under SBE. A tool in the proof is the use of sublinear rays, that is, sublinear bilispchitz embeddings of the half line, generalizing quasi-geodesic rays. As an application we study a pair of right-angled Coxeter groups whose asymptotic cones are not easily described and we use the main result to show that these two groups are not sublinearly biLipschitz equivalent.

SAITO Keima (Kobe University)

No 2-knot has the regular triple point number four

ABSTRACT: Any 2-knot is presented by a diagram with no branch points. Such a diagram is called a regular diagram. The (regular) triple point number of a 2-knot K is the minimal number of triple points for all (regular) diagrams of K . We denote by $t(K)$ and $t_0(K)$ the triple point number and the regular triple point number of K , respectively. It is known that a 2-knot K is ribbon if and only if $t(K) = t_0(K) = 0$, and that any non-ribbon 2-knot K satisfies $t_0(K) \geq t(K) \geq 4$. In this talk, we introduce the Gauss diagram presenting a double point set, and show that there is no 2-knot with $t_0(K) = 4$. By extending this result, Shin Satoh proves that a 2-knot K satisfies $t(K) = 4$ if and only if K is ribbon concordant to the 2-twist-spun trefoil knot. This is a joint work with S. Satoh (Kobe University).

SAWABE Shun (Waseda University)

On the potential function of the colored Jones polynomial with arbitrary colors

ABSTRACT: We introduce the potential function of the colored Jones polynomial for a link with arbitrary colors and provide its geometric meanings. We also consider other invariants for 3-manifolds such as the Witten–Reshetikhin–Turaev invariant, or the relationship to the A-polynomial (the AJ-conjecture).

SEO Donggyun (Seoul National University)

RAAG subgroups of MCGs

ABSTRACT: This is a survey talk about right-angled Artin subgroups of surface mapping class groups.

SHENG Xiaobing (The University of Tokyo)

Some obstructions on subgroups of Brin-Thompson groups

ABSTRACT: Motivated by Burillo, Cleary and Roeper's summary on obstructions of subgroups of Thompson's group V , we explored on the higher dimensional version of the groups, Brin-Thompson groups nV and SV , a class of infinite dimensional Brin-Thompson groups and an easy class of the twisted version of the Brin-Thompson groups SV_G with some certain conditions. We found that they have similar obstructions as Thompson's group V .

STOIMENOV Alexander (KAIST)

Strong quasipositivity of links

ABSTRACT: I will survey some recent results (by myself and partial joint work with Tetsuya Ito) about deciding strong quasipositivity of various classes of links, the question whether all minimal genus surfaces of strongly quasipositive links are strongly quasipositive, and some related questions.

SUN Zhe (University of Science and Technology of China)

Webs on Riemann surfaces

ABSTRACT: I will explain webs play the role of higher integer laminations which generalizes the multicurves on surfaces.

TADOKORO Yuuki (National Institute of Technology, Kisarazu College)

Minimal generating sets of groups of Kim-Manturov

ABSTRACT: S. Kim and V. O. Manturov introduced a certain group derived from triangulations of a surface. Using a combinatorial group method, we give a minimal generating set of the group.

TAKAHASHI Natsuya (Osaka University)

Trisection genus of corks

ABSTRACT: Gay and Kirby introduced the notion of a trisection as a decomposition of a smooth 4-manifold into three 4-dimensional 1-handlebodies. A trisection genus is a fundamental invariant of 4-manifolds defined by trisections. It is a 4-dimensional analogue of a Heegaard genus of a 3-manifold. In this talk, we determine the trisection genus of an infinite family of corks. We also construct low genus relative trisections of an exotic pair of simply-connected 4-manifolds with boundary.

TAKANO Akihiro (The University of Tokyo)

Virtual Thompson's group

ABSTRACT: Recently, Jones introduced a method of constructing links from elements of Thompson's group F and proved Alexander's theorem, that is, any (oriented) link is obtained from an element of this group. In this talk, we extend these results to virtual links. Namely, we define virtual Thompson's group VF whose

elements create virtual links and showed Alexander's theorem. This is joint work with Yuya Kodama (Tokyo Metropolitan University).

TANAKA Kokoro (Tokyo Gakugai University)

The universal covering of a knot n -quandle

ABSTRACT: The knot quandle of a 1-knot is a powerful invariant, but difficult to handle. A certain quotient of the knot quandle, called the knot n -quandle, is a more tractable invariant. Algebraic structure of the knot quandle has been studied to some extent, but that of the knot n -quandle is still poorly understood. In this talk, we show that the universal covering of the knot n -quandle of a 1-knot is the knot quandle of the 2-knot obtained from the 1-knot by n -twist-spinning. We also show that this covering is a central extension. As a corollary, we determine the second quandle homology group of the knot n -quandle. This is a joint work with Yuta Taniguchi (Osaka University).

TANG Robert (XJT Liverpool University)

Cylinder graphs for half-translation surfaces

ABSTRACT: There has been growing interest in studying combinatorial complexes associated to geometric structures on surfaces. For example, the saddle connection graph plays an analogous role to the arc graph in the setting of half-translation surfaces. In this talk, I will discuss the cylinder graph which can be viewed as an analogue of the curve graph. The vertices of this graph are core curves of Euclidean cylinders on a half-translation surface, and adjacency is given by bounded intersection number. This graph naturally embeds into to the curve graph, and so a natural question to ask is whether the embedding is undistorted. I will discuss some progress on this question, and relate it to other known results regarding distortion of combinatorial complexes.

TANIGUCHI Yuta (Osaka University)

Knot quandles and knot groups for 2-knots

ABSTRACT: We give examples of 2-knots with the same knot group but different knot quandles by analyzing the knot quandles of twist-spun knots. If time permits, we give a classification of all twist-spun knots with finite knot quandles using our method.

TATENO Sohei (Nagoya University)

The Iwasawa Invariants of \mathbb{Z}_p^d -covers of links

ABSTRACT: In this talk, we will define the Iwasawa invariants of links and give two asymptotic formulae for the first homology groups of \mathbb{Z}_p^d -covers of links in rational homology 3-spheres, which are generalizations of the Iwasawa type formulae proven by Hillman-Matei-Morishita and Kadokami-Mizusawa. We will also provide examples of these formulae. Moreover, when $d = 2$, considering the twisted Whitehead links, we will explain that Iwasawa μ -invariants can be arbitrarily large. This is a joint work with Jun Ueki.

VERA Anderson (IBS Center for Geometry and Physics)

Double lower central series and a double Johnson filtration for the Goeritz group of the sphere

ABSTRACT: For a triple (K, X, Y) consisting of a group K and two normal subgroups X and Y of K , we introduce a double-indexed family of normal subgroups of K which we call the double lower central series. In particular, if $K = XY$ we show that this family allows us to recover the lower central series of K . If G is a group acting on K preserving X and Y , we show that the double lower central series induces a double-indexed filtration of G . We apply this theory to the group of isotopy classes of self-homeomorphisms of the 3-sphere S^3 which preserves the standard decomposition of S^3 as the gluing of two handlebodies. (Joint work with Kazuo Habiro.)

WADA Kodai (Kobe University)

Characterization of welded links with generalized Brunnian properties

ABSTRACT: Welded links are an extension of classical links in the 3-sphere. For positive integers n and k with $n \geq k$, a welded link is called (n, k) -Brunnian if it is an n -component welded link whose k -component sublinks are all trivial. In this talk, we give a necessary and sufficient condition for a welded link to be (n, k) -Brunnian, which is an extension of Meilhan–Seida–Yasuhara’s characterization of (n, k) -Brunnian classical links. We also address the case of welded string links and report some results on finite type invariants of (n, k) -Brunnian welded (string) links.

WAKAMAKI Yohei (Osaka University)

A cork of the rational surface with second Betti number 9

ABSTRACT: Corks of 4-manifolds are one of the most important objects in the study of exotic 4-manifolds. For example, it is known that, for any exotic pair (X, Y) of simply-connected closed 4-manifolds, Y can be obtained from X by an operation called cork twist along a cork of X . However, despite their importance, there is no known example of a cork of a standard simply-connected closed 4-manifold with second Betti number $b_2 \leq 9$. In this talk, we will give the first such explicit example for $b_2 = 9$ case by finding a cork of $\mathbb{C}\mathbb{P}^2 \# 8\overline{\mathbb{C}\mathbb{P}^2}$.

WAN Renxing (Peking University)

Uniform exponential growth for groups with a proper product action on hyperbolic spaces

ABSTRACT: We prove that under two assumptions of shadowing property and weakly acylindrical action on factors, a finitely generated non-elementary group G acting properly on a finite product of hyperbolic spaces have uniform exponential growth. Moreover, suppose that G acts effectively on each factor, then G has product set growth for any possibly nonsymmetric finite set. These assumptions are full-filled in mapping class groups, so as an application, we cover and strengthen A. Kerr’s result that mapping class groups have product set growth. This is joint work with Wenyan Yang.

WANG Zixi (Zhejiang Normal University)

Profinite rigidity in 4-dim Seifert manifolds

ABSTRACT: After the work of distinguishing 4-dim Thurston's geometries, it is natural to ask the profinite rigidity of related manifolds. We focus on the 4-dim Seifert manifolds over hyperbolic 2-orbifolds, and reclassify the presentation of their fundamental groups by ruling out the affect of different choices of generators. Finally we give a part of condition for them to be profinitely rigid.

XIE Yi (Peking University)

Instanton homology and knot detection on thickened surfaces

ABSTRACT: In this talk, I will characterize all knots in product sutured manifolds that have minimal sutured instanton homology. As an application, I will show that the Asaeda–Przytycki–Sikora homology of a knot K in a thickened genus zero surface has rank 2 if and only if K is isotopic to an embedded knot in a slice of the surface. This is joint work with Zhenkun Li and Boyu Zhang.

XU Binbin (Nankai University)

Equivalent curves on surfaces

ABSTRACT: We consider a closed oriented surface of genus at least 2. To describe curves on it, one natural idea is to choose once for all a collection of curves as a reference system and to hope that any other curve can be determined by its intersection numbers with reference curves. For simple curves, using the work of Dehn and Thurston, it is possible to find such a reference system consisting of finitely many simple curves. The situation becomes more complicated when curves have self-intersections. In particular, for any non-negative integer k , it is possible to find a pair of curves having the same intersection number with every curve with k self-intersections. Such a pair of curves are called k -equivalent curves. In this talk, I will discuss the general picture of a pair of k -equivalent curves and the relation between k -equivalence relations for different k 's. This is a joint-work with Hugo Parlier.

XUE Yuhao (Tsinghua University)

Separating systole for random hyperbolic surfaces of Weil-Petersson model

ABSTRACT: The Weil-Petersson metric on the moduli space of genus g hyperbolic surfaces is of finite volume, and hence induce a probability measure. In this talk, we will discuss the behavior of some geometric quantities, especially the separating systole, for random hyperbolic surfaces with respect to this Weil–Petersson measure. We show that the length of separating systole is approximately $2 \log(g) - 4 \log(\log(g))$ and it separates out a one-holed torus for random hyperbolic surfaces. This talk is based on joint works with Xin Nie, Hugo Parlier and Yunhui Wu.

YAMAGUCHI Kouki (Kyoto University)

The 3-loop polynomial of knots obtained by plumbing the doubles of two knots

ABSTRACT: The 3-loop polynomial of a knot is a polynomial presenting the 3-loop

part of the Kontsevich invariant of knots. In this talk, we calculate of the 3-loop polynomial of knots obtained by plumbing the doubles of two knots; this class of knots includes untwisted Whitehead doubles. Further, we give other results of the calculation about the 3-loop polynomial of knots.

YANG Wenyuan (Peking University)

Cogrowth of divergent groups with contracting elements

ABSTRACT: In this talk, we consider a discrete isometric group action on a geodesic metric space with a contracting element. The growth rate of the action is an important quantity, featuring in the fractal geometry of boundary, the entropy theory of certain dynamical systems and so on. The main result of this talk is that, if the group is of divergent type, the growth rate of any normal subgroup is strictly larger than one half of the whole growth rate. This answers questions of Arzhantseva–Cashen and its proof uses Patterson–Sullivan measure theory.

YASUDA Jumpei (Osaka University)

A note on the plat index for surface-knots

ABSTRACT: A plat form for links is a presentation for classical links using a braid. We can apply this presentation to surface-links, using a braided surface instead of a braid. Using plat form presentation for surface-links, the plat index and the genuine plat index are defined as surface-link invariants, which are analogies of the bridge index for classical links. In this talk, we give examples of surface-knots with the plat index 2. We also give infinitely many surface-knots with the plat index m for any positive integer m .

YOON Seok Beom (Southern University of Science and Technology)

Twisted Neumann–Zagier matrices and loop invariants

ABSTRACT: For a hyperbolic knot the generalized Volume conjecture predicts the asymptotic expansion of the Kashaev invariant, where the coefficients of the asymptotic are given by so-called loop invariants. In this talk, we briefly introduce a notion of twisted Neumann–Zagier matrices and prove that the loop invariants are almost multiplicative under cyclic covers. Moreover, we prove the existence of a polynomial that determines a loop invariant for all finite cyclic covers. This is joint work with Stavros Garoufalidis.

YUN Hongdae (Kyungpook National University)

Geometric realization of the extreme Khovanov homology of pretzel links

ABSTRACT: In 2018, J. Gonzalez-Meneses, P.M.G. Manchon, and M. Silvero showed the (potential) extreme Khovanov homology of a link is isomorphic to the (reduced) homology of the independence simplicial complex of a Lando graph of the link. In this talk, we investigate geometric realizations of the real-extreme Khovanov homology of pretzel links. This partially proves the conjecture stating that the extreme Khovanov homology of any link diagram is torsion-free suggested by M. Silvero and J. H. Przytycki. This is joint work with Jinseok Oh and Seung Yeop Yang.

ZHANG Faze (Northeast Normal University)

The surface complex

ABSTRACT: We introduce the surface complex of a 3-manifold with boundary and show that when the 3-manifold is irreducible with compressible boundary surface, the surface complex is contractible.

ZHANG Qiang (Xi'an Jiaotong University)

Explicit bounds for fixed subgroups of endomorphisms of free products

ABSTRACT: For an automorphism ϕ of a free group F_n of rank n , Bestvina and Handel showed that the rank of the fixed subgroup of ϕ is not greater than n (the so-called Scott conjecture). Soon after Bestvina and Handel's announcement, their result was generalized by many authors in various directions. In this paper, we are interested in the fixed subgroups of endomorphisms of free products, focusing on explicit bounds for their ranks. This is joint work with Jialin Lei.

ZHAO Yanxin (XJT Liverpool University)

Some properties of the group of quasi-isometries of the real line

ABSTRACT: We prove that the group $QI^+(\mathbb{R})$ of orientation-preserving quasi-isometries of the real line is left-orderable, not simple, but cannot act effectively on the real line. This is joint work with Shengkui Ye.

ZHENG Fangting (XJT Liverpool University)

Hyperbolic reflection groups

ABSTRACT: In this talk, some new results regarding the (cocompact/co-finite-volume) high-dimensional hyperbolic reflection groups that we achieved in recent years will be presented. This is based on a series of joint works with Jiming Ma.

ZHOU Ze (Shenzhen University)

Polygons inscribed in Jordan curves with prescribed edge ratios

ABSTRACT: Let J be a smooth Jordan curve. For a tuple of positive numbers a_1, \dots, a_n , each of which is less than the sum of the others, we show that there exists a polygon Q_n inscribed in J with sides of lengths a_1, \dots, a_n for some $\epsilon > 0$. This is joint work with Yaping Xu.

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