Program

２月１０日（土）

13:30 – 14:20　小森洋平（早稲田大学）
On bicolored eigenvalues of higher-rank Coxeter systems

14:30 – 15:20　石橋典（東京大学）
Cluster Dehn twists in cluster modular groups

15:50 – 16:40　田中淳波（東京大学）
Wrapping projections and decompositions of Kleinian Groups

16:50 – 17:40　大鹿健一（大阪大学）
Discontinuous motions of Cannon-Thurston maps

２月１１日（日）

10:00 – 10:50　吉田建一（京都大学）
Intersecting 3-punctured spheres in hyperbolic 3-manifolds and their parametrizations

11:00 – 11:50　稲垣友介（大阪大学）
On Fuchsian loci of $\mathrm{PSL}_n(\mathbb{R})$-Hitchin components of a pair of pants

昼休み

13:30 – 14:20　濱野佐知子（大阪市立大学）
Variation of the **a**-span of an open Riemann surface and pseudoconvexity

14:30 – 15:20　増本誠（山口大学）
Measured foliations and compact continuations of Riemann surfaces

15:50 – 16:40　山下靖（奈良女子大学）
The realization problem for Jorgensen numbers

16:50 – 17:40　小林亮一（名古屋大学）
Holomorphic Curves in Compact Complex Parallelizable Manifold $\Gamma\backslash\mathrm{SL}(2,\mathbb{C})$

２月１２日（月）

10:00 – 10:50　伊藤哲也（大阪大学）
Directed arc complex and topology/geometry of (contact) 3-manifold

11:00 – 11:50　松本幸夫（学習院大学）
Orbifold charts of the compactified moduli spaces and crystallographic groups

Abstract

２月１０日（土）

小森洋平（早稲田大学）

On bicolored eigenvalues of higher-rank Coxeter systems

A Coxeter system (W, S) defines a W-invariant symmetric bilinear form B on $V = \mathbf{R}^n$ (where $n = |S|$) and the geometric action $W \to O(V, B)$ is faithful. Any irreducible Coxeter system can be classified into spherical, affine, hyperbolic and higher-rank if the signature of B is $(n, 0), (n-1, 0), (p, 1)$, and (p, q) $(q \geq 2)$. Curt McMullen showed that the spectrum radius $\beta(W, S)$ of the bicolored Coxeter element attains the minimum of those of Coxeter elements of a bipartite Coxeter system (W, S). He also proved that when a Coxeter system (W, S) is bipartite, crystallographic and hyperbolic, then $\beta(W, S)$ is a Salem number. In my talk I will consider higher-rank Coxeter systems and explain the reason why 2-Salem numbers naturally come on the stage.

石橋典（東京大学）

Cluster Dehn twists in cluster modular groups

Fock-Goncharov により導入されたクラスターモジュラー群は, クラスター代数の理論におけるある種の自己同型群である. クラスターモジュラー群はクラスターアンサンブルと呼ばれる多様体のペア (A,X) に自然に作用する. これらの対象は種子と呼ばれるデータに付随するものであるが, 針孔付き曲面の理想三角形分割から決まる特別な種子の場合にはクラスターモジュラー群=(tag 付き) 写像類群, A=decorated Teichmuller space, X=enhanced Teichmuller space となることが知られている. また適切な種子の選択に応じて, クラスター代数の理論は Teichmuller 理論のほか代数群の二重 Bruhat 胞体, 量子群の結晶基底, 高次 Teichmuller 空間などさまざまな対象を記述できることが知られている.

本講演では写像類群の Dehn twist に類似の元 (cluster Dehn twist とよぶ) を一般のクラスターモジュラー群に対して定義し, その性質について述べる. 曲面の写像類群の Dehn twist および half twist は cluster Dehn twist である. 一般に cluster Dehn twist の A 空間への作用の軌道が, 写像類群の Dehn twist の Teichmuller 空間への作用と同様の漸近挙動をもつことを示す. さらに有限変異型と呼ばれる種子のいくつかについて, クラスターモジュラー群が cluster Dehn twist たちで生成されることを示す. これは曲面の写像類群が Dehn twist および half twist たちで生成されるという古典的な事実の拡張を与える.

田中淳波（東京大学）

Wrapping projections and decompositions of Kleinian Groups

Let S be a closed surface of genus $g \geq 2$. The deformation space $AH(S)$ consists of (conjugacy classes of) discrete faithful representations $\rho : \pi_1(S) \to PSL_2(\mathbb{C})$. McMullen, and Bromberg and Holt showed that $AH(S)$ can self-bump, that is, the interior of $AH(S)$ has the self-intersecting closure. Both of them demonstrated the existence of self-bumping under the exisetence of a non-trivial wrapping projections from an algebraic limits to a geometric limits which wraps an annulus cusp into a torus cusp.

In this talk, given a representation ρ at the boundary of $AH(S)$, we characterize a wrapping projection to a geometric limit associated to ρ, by the information of the actions of decomposed Kleinian groups of the image of ρ.

大鹿健一（大阪大学）

Discontinuous motions of Cannon-Thurston maps

「Klein 群の変形空間において，Cannon-Thurston 写像が連続に動くか」というのは Thurston の 24 問題の 1 つである．この講演では，Klein 曲面群の場合に，C-T 写像が不連続になる状況の完全な criterion を与える．時間があれば他の Klein 群の場合への議論の一般化についても触れたい．Mahan Mj との共同研究に基く．

２月１１日（日）

吉田建一（京都大学）

Intersecting 3-punctured spheres in hyperbolic 3-manifolds and their parametrizations

A 3-punctured sphere in a hyperbolic 3-manifold is isotopic to a totally geodesic one. In this talk, we consider intersecting 3-punctured spheres in a hyperbolic 3-manifold. We classify the topological types of the union of 3-punctured spheres. There are some special types of the union, each of which appears in precisely one manifold. The most general type form a line in a hyperbolic 3-manifold. The metric of a neighborhood of such 3-punctured spheres is determined by the modulus of an adjacent cusp. We describe the set of such moduli. This set becomes smaller as the number of 3-punctured spheres increases.

稲垣友介（大阪大学）

On Fuchsian loci of $\mathrm{PSL}_n(\mathbb{R})$-Hitchin components of a pair of pants

Hitchin components are the connected components of character varieties of surface groups containing Teichmüller spaces, and the subsets of Hitchin components which correspond to Teichmüller spaces are called Fuchsian loci. Recently Bonahon-Dreyer constructed a parameterization of $\mathrm{PSL}_n(\mathbb{R})$-Hitchin components by using the Anosov property of elements of $\mathrm{PSL}_n(\mathbb{R})$-Hitchin components and invariants of flags introduced by Fock-Goncharov, which is a parameterization by Euclidian convex polytopes. In this talk, we give an explicit description of Fuchsian loci of a pair of pants by using the Bonahon-Dreyer parameterization.

濱野佐知子（大阪市立大学）

Variation of the a-span of an open Riemann surface and pseudoconvexity

Let R be a marked open Riemann surface of finite genus. If there exists a conformal embedding of R into a closed Riemann surface $\widetilde{R}$ of the same genus with prescribed homological types of surfaces, $\widetilde{R}$ is called a closing of R. A closing of R induces the Riemann's period matrix T of $\widetilde{R}$. Shiba-Yamaguchi investigated the set of all closings of R, and showed that each diagonal element of T is a closed disk $\mathfrak{M}$ in the upper half plane. In this talk, we study variation of the period matrices $T(t)$ of the closings of an open Riemann surface $R(t)$ with complex parameter t, and show the rigidity of hyperbolic diameter of $\mathfrak{M}(t)$ under the pseudoconvex variation of $R(t)$. This talk is based on a joint work with Masakazu Shiba and Hiroshi Yamaguchi.

増本誠（山口大学）

Measured foliations and compact continuations of Riemann surfaces

In 1928 Bochner asserted that every Riemann surface R of finite genus g can be conformally embedded into a compact Riemann surface of the same genus. However, there may be two or more compact Riemann surfaces of genus g into which R can be conformally embedded. Several authors have studied the set $M(R)$ of possible targets. We employ measured foliations to investigate $M(R)$, and considerably improve preceding results.

山下靖（奈良女子大学）

The realization problem for Jorgensen numbers

Let G be a two generator subgroup of $\mathrm{PSL}(2,\mathbb{C})$. The Jørgensen number $J(G)$ of G is defined by

$$J(G) = \inf\{|\operatorname{tr}^2 A - 4| + |\operatorname{tr}[A,B] - 2|\,;\, G = \langle A, B\rangle\}.$$

If G is a non-elementary Kleinian group, then $J(G) \geq 1$. This inequality is called Jørgensen's inequality. In this talk, we show that, for any $r \geq 1$, there exists a non-elementary Kleinian group whose Jørgensen number is equal to r. This answers a question posed by Oichi and Sato. (This is a joint work with R. Yamazaki)

小林亮一（名古屋大学）

Holomorphic Curves in Compact Complex Parallelizable Manifold $\Gamma\backslash\mathrm{SL}(2,\mathbb{C})$

Let $\Gamma \subset \mathrm{SL}(2,\mathbb{C})$ be a cocompact lattice and $X = \Gamma\backslash\mathrm{SL}(2,\mathbb{C})$ the associated compact complex parallelizable manifold. We show that any holomorphic map $f : M \to X$ from a compact Riemann surface M into a compact complex parallelizable manifold X is expressed as a composition $f = t \circ h \circ \alpha$ where $\alpha : M \to \mathrm{Alb}(M)$ is the Albanese map, the the map $h : \mathrm{Alb}(M) \to X = \Gamma\backslash\mathrm{SL}(2,\mathbb{C})$ has its image in a maximal torus T in X defining an algebraic group homomorphism $h : \mathrm{Alb}(M) \to T$, and t is a right translation by some element of $\mathrm{SL}(2,\mathbb{C})$.

２月１２日（月）

伊藤哲也（大阪大学）

Directed arc complex and topology/geometry of (contact) 3-manifold

We introduce a variant of an arc complex that adds information of ordering (direction). We discuss an action of mapping class group of this directedarc complex, and show that it reflects a topology/geometry in a better way than usual arc complex. This point of view is a generalization and refinement of the fractional Dehn twist coefficient (FDTC) arguments which plays a fundamental role in open book decomposition of (contact) 3-manifolds This talk is based on open book foliation theory developed in joint works with Keiko Kawamuro (Univ. Iowa).

松本幸夫（学習院大学）

Orbifold charts of the compactified moduli spaces and crystallographic groups

In this talk, we will construct an orbifold-atlas on the Deligne-Mumford compactification of the moduli space of Riemann surfaces. Our method is based on the mapping class groups, the curve complexes, and the Fenchel-Nielsen coordinates. As a by-product, we will show that at maximally degenerated frontier points there arise certain Euclidean crystallographic groups.