

Yerevan Higher Spin Workshop 2026

Seminar titles, abstracts, and Gong Show proposals

1. Schedule: speakers and titles

Titles not yet supplied are marked TBA.

Monday 31/08

Seminar	Speaker	Title
1	Radu Roiban	Classical Higher-Spin Particles Beyond Fixed Spin: Degrees of Freedom, Dynamical Multipoles, and Kerr
2	Thomas Basile	Spinor-helicity formalism for continuous spin particles
3	Yasha Neiman	dS/CFT beyond minimal type-A, and the doubled nature of de Sitter space
4	Gleb Arutyunov	Spin Ruijsenaars-Schneider models from Coulomb branches of supersymmetric gauge theories
5	Sachin Jain	Cosmological Grassmannians, Chiral Higher-Spin Theory and Boundary Correlators
6	Euihun Joung	Worldline Higher Spin Gravity
7	Alex S Arvanitakis	<i>TBA</i>
8	Tung Tran	Higher spin gravity and twistor framework

Tuesday 01/09

Seminar	Speaker	Title
9	Chris Hull	Superstring Field Theory
10	Andrea Campoleoni	Massive higher-spin fields in the fractional quantum Hall effect
11	Dmitri Sorokin	Remarks on invariants of tensor fields
12	Zhenya Skvortsov	Self-dual holography: AdS & flat
13	Anastasia Golubtsova	Continuous Spin Equations in AdS ₄
14	Nikita Zaigraev	Interactions in N=2 Higher-Spin Theories

Wednesday 02/09

Seminar	Speaker	Title
15	Glenn Barnich	Robinson-Trautman waves: From memory to thermodynamics
16	Dmitry Ponomarev	On admissible higher-spin algebras in flat space
17	Falk Hassler	α' -Bootstrap
18	Alexander Ochirov	From massive higher spins to rotating black holes
19	Dario Francia	Higher spin Lagrangians from higher derivative diffeomorphisms
20	Karapet Mkrtchyan	Democracy for higher spins
21	Rohit Reghupathy	<i>TBA</i>
22	Alexey Sharapov	Auxiliary Fields and Lagrangians for Relativistic Wave Equations
23	Per Sundell	Quantum Fields Unfolded

Thursday 03/09

Seminar	Speaker	Title
24	Mikhail Vasiliev	<i>TBA</i>
25	Atul Sharma	A hologram of super Yang-Mills at weak coupling
26	Carlo Iazeolla	Higher spins, holography and exotic matter

Seminar	Speaker	Title
27	Yihao Yin	Instanton Solutions to Chiral Higher Spin Gravity

Friday 04/09

Seminar	Speaker	Title
28	Simon Pekar	Flat from AdS: in any dimension and for any spin
29	Mirian Tsulaia	Twistor Approach to a D0 brane
30	Evgeny Ivanov	4D, N=2 conformal and AdS superspins via harmonic superspace
31	Slava Didenko	<i>TBA</i>
32	Maxim Grigoriev	Topological deformations of local gauge theories
33	Sergei Kuzenko	Superconformal Higher Spins Down Under

2. Scheduled talks: titles and abstracts

The order follows the latest workshop schedule. Missing material is marked TBA.

Monday 31/08

Seminar 1 – Radu Roiban

Title: Classical Higher-Spin Particles Beyond Fixed Spin: Degrees of Freedom, Dynamical Multipoles, and Kerr

Abstract

The construction of an effective field theory describing the long-distance interactions of Kerr black holes remains elusive.

As a step in this direction, we discuss relativistic effective field theories designed to capture the long-distance gravitational interactions of massive spinning particles. While "no-go" theorems severely constrain the formulation of interacting higher-spin theories, we argue that these challenges can be navigated in the classical limit through the use of spin coherent states.

Such states naturally incorporate gapless excitations which can provide a description for processes in which the magnitude of the spin evolves dynamically. We discuss the broader applicability of this framework, showing that it captures certain supersymmetric black holes as well as the dynamics of Newtonian bound states under external probes. We conclude by outlining possible strategies for identifying Kerr black holes within this framework.

Seminar 2 – Thomas Basile

Title: Spinor-helicity formalism for continuous spin particles

Abstract

We propose a realisation of continuous-spin particles (CSP), as inhomogeneous functions of a single two-component spinor whose homogeneous components correspond to helicity eigenstates. This formulation allows to write down amplitudes in a similar way to the massless and massive spinor-helicity approach. We show that they can be understood as the infinite-spin limit of amplitudes of massive particles and generically feature a 'universal' exponential factor. On top of that, we find nontrivial CSP collinear amplitudes, which are of distributional nature and whose supports are constrained by the 'continuous-spin scales' (i.e. the parameter labelling the little group representation of CSPs). Based on joint work with X. Bekaert, F. Figueroa & E. Skvortsov [2606.28245].

Seminar 3 – Yasha Neiman

Title: dS/CFT beyond minimal type-A, and the doubled nature of de Sitter space

Abstract

We describe the single-particle Hilbert space of an HS multiplet in de Sitter space, using HS algebra. The positive-definite Hermitian norm uses a non-standard complex conjugation, which leads to a new real form of the Vasiliev equations. We supplement this with new reality conditions for the dS/CFT boundary theory, which serve to extend dS/CFT from minimal type-A to odd spins, and to type-B (however, no SUSY or bulk fermions). Finally, we paint a deranged picture in which type-A and type-B are the same theory in Euclidean AdS, and two distinct theories in de Sitter. This provides a concrete realization of the basic "paradox" of dS/CFT, where de Sitter is both an analytic continuation of Euclidean AdS, and is twice larger than it.

Seminar 4 – Gleb Arutyunov

Title: Spin Ruijsenaars-Schneider models from Coulomb branches of supersymmetric gauge theories

Abstract

I will explain the recently discovered relation between the Coulomb branch algebras of 4d $N=2$ supersymmetric necklace quiver gauge theories and spin Ruijsenaars-Schneider models, which provides a Poisson structure and a quantization of the latter.

Seminar 5 – Sachin Jain

Title: Cosmological Grassmannians, Chiral Higher-Spin Theory and Boundary Correlators

Abstract

I will discuss an attempt at understanding four- and higher-point scalar and spinning correlators in higher-spin and chiral higher-spin theories, using the cosmological Grassmannian as an organizing framework.

Seminar 6 – Euihun Joung

Title: Worldline Higher Spin Gravity

Abstract

We propose a worldline formulation of higher-spin gravity (HSG) in AdS₄, based on a simple twistor action. While the model naively describes only free massless higher-spin fields, it admits a natural double-line interpretation that geometrically prescribes gluing worldlines at interaction vertices, paralleling string joining. Using this picture, we construct AdS-covariant vertex operators for all massless higher-spin fields, verify they satisfy the Bargmann-Wigner equations, and compute n-point correlators of type-A and type-B HSG as worldline path integrals, reproducing free vector-model current correlators at the boundary.

Seminar 7 – Alex S Arvanitakis

Title: *TBA*

Abstract

TBA

Seminar 8 – Tung Tran

Title: Higher spin gravity and twistor framework

Abstract

We discuss the twistor framework as an efficient tool for understanding various properties of higher spin gravity (HSG). In the first part of the talk, we show how projectivity of twistor geometry can be used to construct local chiral higher spin theories, and mention the possibility of quasi-local theories whose local sector produces non-trivial amplitudes while bypassing some no-go theorems in flat space. In the second part, we turn to the first-quantized picture of HSG, and to how twistor theory can address — or sidestep — the non-locality inherent to unitary HSG, which is conjecturally tied to the tensionless limit of string theory. As a concrete example, we discuss the recent twistorial worldline higher spin gravity in AdS₄. At the operator level, we observe a one-to-one matching between bulk operators and CFT₃ conserved currents, hinting that a first-principles derivation of the HSG/vector model duality may be possible. We close with open questions on the first-quantized picture of HSG, and other settings where higher spin techniques may find application.

Tuesday 01/09

Seminar 9 – Chris Hull

Title: Superstring Field Theory

Abstract

TBA

Seminar 10 – Andrea Campoleoni

Title: Massive higher-spin fields in the fractional quantum Hall effect

Abstract

Quantum Hall fluids provide an example of quantum matter whose low-energy bulk dynamics is governed by collective deformations of an incompressible fluid. Gapped excitations transforming as spin-2 objects under rotations have recently been observed experimentally, revealing a connection between collective dynamics and

emergent geometry. This spin-2 excitation is expected to be the first in a hierarchy of higher-spin modes describing increasingly complex deformations of the quantum fluid.

We shall briefly review how higher-spin fields emerge in this context and show that, in the linearized regime, these collective excitations are described by a Schrödinger-like action obtained as the non-relativistic limit of massive higher-spin actions.

Seminar 11 – Dmitri Sorokin

Title: Remarks on invariants of tensor fields

Abstract

The demand to know the structure of functionally independent invariants of tensor fields arises in many problems of theoretical and mathematical physics, for instance for the construction of interacting higher-order tensor field actions, such as those of Higher-Spin Theories. In mathematical terms the question is what is the structure of the ring of the invariants of a given module V of a semi-simple Lie algebra $\mathfrak{g}$? We will discuss this problem on several examples, including symmetric spin-tensor fields of $SL(2)$ in $D=3$, a rank-2 antisymmetric (Maxwell field strength) tensor of $SO(1,3)$ in $D=4$, a self-dual 3-form of $SO(1,5)$ in $D=6$ and a self-dual 5-form of $SO(1,9)$ in $D=10$ space-time.

Seminar 12 – Zhenya Skvortsov

Title: Self-dual holography: AdS & Flat

Abstract

Self-dual theories are useful toy models of the unitary completions. Their higher-spin extensions are even more useful since the unitary completion is beyond reach at present. I will describe recent progress in constructing self-dual theories with higher-spin fields and embedding them into the web of holographic dualities, both in AdS and flat spaces.

Seminar 13 – Anastasia Golubtsova

Title: Continuous Spin Equations in AdS_D

Abstract

We present Wigner-type equations of motion for continuous spin fields in AdS_D of arbitrary dimension. The formulation utilizes a system of constraints that uniquely fix the Casimir operators of the $so(2, D-1)$ algebra. Starting from the flat-space symmetric subclass of continuous spin representations, we extend the equations to the AdS background via a consistent deformation of covariantized constraints. These constraints are explicitly realized using covariant derivatives and internal spin-space variables for both bosonic and fermionic fields, with the latter formulated within the $osp(1|2)$ superalgebra. Finally, we match these representations with the Metsaev classification to identify the exact ranges of the continuous spin parameter μ that yield unitary irreducible representations in AdS.

Seminar 14 – Nikita Zaigraev

Title: Interactions in N=2 Higher-Spin Theories

Abstract

We review the known constructions of cubic interactions in N=2 higher-spin theories in four dimensions. Starting from the harmonic-superspace formulation of free multiplets, we discuss conserved higher-spin supercurrents, the classification of abelian vertices, and some explicit examples. The talk also covers rigid higher-spin symmetries of the N=2 vector multiplet and their relation to even/odd spin couplings.

Seminar 15 – Glenn Barnich

Title: Robinson-Trautman waves: From memory to thermodynamics

Abstract

The memory effect for Robinson-Trautman waves is explicitly worked out. News-free solutions are studied in detail and correspond to boosted Schwarzschild black holes. Their thermodynamics is worked out in a concise way and shown agree with expectations from relativistic thermodynamics.

Seminar 16 – Dmitry Ponomarev

Title: On admissible higher-spin algebras in flat space

Abstract

We study higher-spin algebras in flat space, that admit massless higher-spin fields as a representation. Once certain simplifying assumptions are made, we find that these split into two classes, which we refer to as collinear and half-collinear. Half-collinear algebras contain the chiral higher-spin algebra and its parity-invariant completion as particular cases. By directly solving the Jacobi identity we also find a two-parametric family of collinear higher-spin algebras.

Seminar 17 – Falk Hassler

Title: α' -Bootstrap

Abstract

T-duality is more than a mere redundancy of string theory; it is a powerful predictive tool for constraining the effective action. However, constructing higher-derivative corrections, especially for non-chiral theories, such as the bosonic string, typically involves an order-by-order procedure that becomes computationally prohibitive beyond the leading orders. In this talk, we address this issue by introducing an alternative approach to the current standard method, the generalized Bergshoeff-de Roo identification. Thereby, we bypass the existing bottlenecks to reveal a much simpler way to obtain higher derivative corrections in string theory.

Seminar 18 – Alexander Ochirov

Title: From massive higher spins to rotating black holes

Abstract

I will discuss infinite families of massive higher-spin amplitudes at the 3- and 4-point level in gauge theory and gravity, how their spin-multipole structure relates to the Kerr solution, and their classical limit in which they can be used for computing Kerr black-hole scattering dynamics.

Seminar 19 – Dario Francia

Title: Higher spin Lagrangians from higher derivative diffeomorphisms

Abstract Gauge symmetry typically plays two related, yet distinct, roles. On the one hand, it is a group-theoretical feature of the covariant description of $\text{iso}(D-2)$ massless representations with finite spin. On the other hand, it serves as a guideline for building off-shell kinetic tensors and Lagrangians for the corresponding degrees of freedom via the Noether procedure. The standard assumption is that the gauge parameters entering the two settings are tensors of the same rank. We question this identification and show that it is actually possible to uniquely identify the Fronsdal kinetic tensor by requiring invariance under a reduced gauge symmetry, where the parameter is a multiple gradient of a vector parameter. This observation hints at a tighter, if unexpected, connection between higher-spin symmetry and diffeomorphisms.

Seminar 20 – Karapet Mkrtchyan

Title: Democracy for higher spins

Abstract:

I will discuss recent advance in covariant democratic approach beyond spin one (p-forms)

Seminar 21 – Rohit Reghupathy

Title: *TBA*

Abstract

TBA

Seminar 22 – Alexey Sharapov

Title: Auxiliary Fields and Lagrangians for Relativistic Wave Equations

Abstract

The problem of the existence of a Lagrangian formulation for general systems of linear PDEs with constant coefficients is considered. A prerequisite step in this analysis involves casting the system into a pre-Lagrangian form where the number of equations equals the number of unknowns. A necessary and sufficient condition is found for a system to admit a pre-Lagrangian formulation without gauge symmetries, and a simple algorithm for introducing auxiliary fields is proposed. Systems satisfying this condition are termed co-flat, and it is demonstrated that they invariably admit a pre-Lagrangian representation in the extended space of fields. Furthermore, it is shown that such systems also possess alternative pre-Lagrangian formulations entirely free of auxiliary fields. Some obstructions to the existence of a genuine Lagrangian formulation are also discussed. As an application of the proposed method, new Lagrangians for free massive fields of arbitrary integer spin are derived. In contrast to the classic Singh–Hagen models, the resulting Lagrangians require significantly fewer auxiliary fields.

Seminar 23 – Per Sundell

Title: Quantum Fields Unfolded

Abstract

Returning to the roots of quantum mechanics, we take a modern look at how particles and fields can be fused into noncommutative geometries based on factorising differential graded algebras and how commutative spacetime geometries arise within this framework as Landau-Ginzburg-like effective descriptions. This approach to quantum field theory, which is very much in the making, is largely motivated by attempts to broaden the arena for higher-spin gravity into a ring with dual corners, inspired, on the one hand, by Jacobson's relaxed view on quantum gravity, and, on the other hand, by the refinement of Dirac and von Neumann's formulation of quantum dynamics due to Aharonov-Bergmann-Lebowitz, and later Lindblad, from closed to open quantum systems. In this context, we view Dirac's conformal particles, Vasiliev's induced higher-spin gravities, and related classical multi-body systems for ordinary gravity as useful models for testing new principles of quantum mechanics, in particular, the need to enter Hermitian spaces and refinements of the variational principle based on Alexandrov-Kontsevich-Schwarz-Zaboronsky sigma models.

Thursday 03/09

Seminar 24 – Mikhail Vasiliev

Title: *TBA*

Abstract

TBA

Seminar 25 – Atul Sharma

Title: A hologram of super Yang-Mills at weak coupling

Abstract

What is the hologram of gauge theory at weak 't Hooft coupling? Despite substantial progress in tensionless string holography for weakly coupled 2d CFTs, this question has remained a puzzle in the context of 4d CFTs. In recent work with David Skinner, we answer this question for $N = 4$ self-dual Yang-Mills, which is a particular zero coupling limit of $N = 4$ super Yang-Mills that finds many applications to integrability and scattering amplitudes. Its string dual is found to be a twistor string theory coupled to a suitable backreaction. We describe the promise of this duality for precision tests of holography, including matching non-BPS quantities.

Seminar 26 – Carlo Iazeolla

Title: Higher spins, holography and exotic matter

Abstract

I will show how Vasiliev's 4D higher-spin gravity and 3D coloured conformal higher-spin gravity (i.e., coloured conformal matter fields coupled to conformal higher-spin gauge fields and colour gauge fields) emerge as two consistent reductions of a common parent model. The latter consists, on-shell, of a flat superconnection valued in a fractional-spin extension of Vasiliev's higher-spin algebra. The higher-spin gravity and coloured conformal higher-spin gravity reductions are characterised by dual structure groups, and their embedding in a common parent model provides a rationale for deriving holographic relations between them. I will also highlight an intermediate 4D reduction, which can be referred to as fractional-spin gravity, consisting of exotic matter, in the form of coloured singletons, coupled to higher-spin and colour gauge fields.

Seminar 27 – Yihao Yin

Title: Instanton Solutions to Chiral Higher Spin Gravity

Abstract

TBA

Friday 04/09

Seminar 28 – Simon Pekar

Title: Flat from AdS: in any dimension and for any spin

Abstract

We recover the space of solutions to the Fronsdal field equations in Minkowski spacetime as a smooth limit of the anti-de Sitter one, for any spin and any (even) spacetime dimension. In particular, the « source » gives rise to (the higher-spin analogues of) the gravitational shear tensor, while the « vev » yields (the analogues of) the mass and angular-momentum aspects, as well as an infinite subleading tower of boundary data. These identifications are further supported by the branching of the corresponding Verma modules into representations of a Lorentz subalgebra. Based on [2606.03955], in collaboration with X. Bekaert, A. Campoleoni and S.I. Aadharsh Raj.

Seminar 29 – Mirian Tsulaia

Title: Twistor Approach to a D0 brane

Abstract

We start with a four dimensional massless superparticle model, formulated in terms of twistor variables. We perform its quantization and show that the resulting spectrum is a four dimensional chiral $N=1$ supermultiplet. We also discuss how to obtain massless higher spin fields in this approach. Next, we generalize this construction to the type IIA superspace, present an action for a single D0 brane in terms of twistor variables and show that the quantization leads to a massive type IIA supermultiplet. Finally, we discuss how to compute superamplitudes for the massive and massless fields in ten dimensions.

Seminar 30 – Evgeny Ivanov

Title: 4D, $N=2$ conformal and AdS superspins via harmonic superspace

Abstract

Basics of the off-shell description of 4D, $N=2$ supersymmetric higher-spin theories in terms of harmonic superspace are outlined, with the main focus on a recent construction of their superconformal and AdS versions. An adequate arena to deal with the latter theories is AdS₄ harmonic superspace.

Seminar 31 — Slava Didenko

Title: *TBA*

Abstract

TBA

Seminar 32 — Maxim Grigoriev

Title: Topological deformations of local gauge theories

Abstract

Same degrees of freedom can be described by systems having different gauge structure and field content. The usual example is duality between the scalar field and the 2-form gauge field in 4d. In some precise sense the space of gauge inequivalent formal solutions for such systems differ by finite-dimensional sector. Moreover, because the gauge sectors of such systems are generally different, their consistent interactions, including coupling to spacetime topology, may differ substantially. We demonstrate that deformations of this type can be naturally generated by gauging symmetries of generic degree. This can be done systematically within a presymplectic BV-AKSZ approach. Of particular interest is gauging the degree 1 symmetries (deformations) as this leads to new global degrees of freedom such as the cosmological constant in unimodular gravity.

Seminar 33 — Sergei Kuzenko

Title: Superconformal Higher Spins Down Under

Abstract

This talk will review recent progress in the construction of extended superconformal higher-spin gauge theories on conformally flat backgrounds.

3. Gong Show

1. Jin Kozaki

Title: Interactions of Higher-Spin Fields on the Lightcone in (Anti-)De Sitter Spacetime

Abstract

We study higher-spin theory, which can describe the interactions of Yang-Mills and general relativity in a unified manner. We focus on the cubic interaction in this theory in 4-dimensional spacetime, within the lightcone formalism. The main result of this work is an explicit expression for the cubic vertex that is consistent with the (anti-)de Sitter background. Using this result, we show that the (anti-)chiral sector of the theory is fully consistent with the background spacetime without requiring higher-order interactions.

2. Soumya Adhikari

Title: Type IIB supergravity and Holography

Abstract

Holographic observables like the free energy are usually computed from the Euclidean on-shell action of lower-dimensional gauged supergravity, yet they should in principle follow directly from the ten-dimensional Type IIB action. The obstruction is that the Type IIB pseudo-action vanishes on $\text{AdS}_5 \times S^5$. Kurylyand and Tseytlin recently resolved this in the PST formulation by adding a topological boundary term, but only for restricted backgrounds with vanishing two-forms. In this talk, I will discuss our recent work in which we extend this framework with a generalised topological correction that is valid under milder assumptions, allowing non-vanishing two-form potentials. Applying it to $\text{AdS}_5 \times M_5$ geometries, including S^5 and the Lunin--Maldacena background, as well as $\text{AdS}_4 \times M_6$, we show the ten-dimensional on-shell actions precisely reproduce the lower-dimensional gauged supergravity results.

3. Sourav Roychowdhury

Title: Attractor mechanism: Trio of effective black hole potential, entropy functional and Routhian

Abstract

In this talk we discuss various aspects of the effective dynamics of Maxwell-Einstein scalar theories in the background of static, spherically symmetric and extremal black hole solution in (1+3) dimensions. We show that the effective one dimensional action (governed by the Attractor mechanism) from which the effective black hole potential (introduced by Ferrara-Gibbons-Kallosch) is usually computed, is the one dimensional effective Routhian of the original (1+3)d action. We further discuss the interplay of this Routhian framework, black hole potential and Sen's entropy functional approach, enabling one to compute the black hole entropy.

4. Dmitry Rudinsky

Title: Algebraic presymplectic AKSZ models

Abstract

The standard AKSZ construction provides an elegant geometric formulation of topological field theories, but several generalizations have been proposed to extend it to theories with local degrees of freedom. Different approaches modify different ingredients of the AKSZ data: one may relax the symplectic structure on the target or replace the standard source by a differential graded algebra with nontrivial relations. We introduce an algebraic presymplectic AKSZ framework that naturally incorporates both possibilities. Within this framework, we study when degeneracies encoded in the target can be transferred to the source algebra, leading to equivalent descriptions of the same BV theory. As an application, we consider chiral higher-spin fields, where this construction leads naturally to a mixed description involving nontrivial algebraic structures on both the source and the target.

5. Sejin Kim

Title: Edge mode action of massless spin-s field in three dimensions

Abstract

We studied the edge mode action of a massless spin-s field in three dimensions, using the Stueckelberg trick.

6. Adil Imam

Title: Local Marking of Locally Implementable Unitary Operations

Abstract

We investigate the task of local marking for locally implementable unitary operations. In this setting, multipartite quantum unitary channels, chosen randomly from a known set, are distributed among spatially separated parties without revealing their identities. The objective is to correctly identify (mark) the applied process using only local operations supplemented with classical communication (LOCC). While local distinguishability implies local marking, local marking does not guarantee either local or even global distinguishability of a set of unitaries. Thus the task of marking is not equivalent to the task of discrimination. We demonstrate a stronger manifestation of nonlocality without entanglement by constructing a set of globally distinguishable tripartite product unitaries that cannot be locally marked. In contrast to state marking, we find that marking a subset of product unitaries does not imply the ability to mark a larger subset. Finally, we explore the hierarchy of probes -- entangled and product -- in the context of local marking with respect to the standard discrimination scenario.

7. Min-Kyeu Cho

Title: Higher-Spin Gravity in de Sitter Space

Abstract

Higher-spin gravity extends gravity by including an infinite tower of gauge fields with spin greater than two. In this talk I discuss how such a theory can be formulated on a de Sitter background, and how its symmetry structure differs from the familiar anti-de Sitter case. I also briefly outline the questions I am currently pursuing in this direction.