

# Theory Canada 16 2024 - Programme

## Schedule Overview

**Location: Institute for Quantum Computing, University of Waterloo**

*Friday, May 24*

|              |  |
|--------------|--|
| 0846 - 09 00 | Welcome                                  |
| 0900 - 09 30 | Plenary 1                                |
| 0945 - 1045  | Parallel Sessions 1A & 1B (3 talks each) |
| 1045 - 1115  | Refreshments break                       |
| 1115 - 1235  | Parallel Sessions 2A & 2B (4 talks each) |
| 1235 - 1400  | Lunch                                    |
| 1400 - 1500  | Parallel Sessions 3A & 3B (3 talks each) |
| 1500 - 1515  | Refreshments break                       |
| 1515 - 1545  | Plenary 2                                |
| 1545 - 1600  | Break                                    |
| 1600 - 1700  | Parallel Sessions 4A & 4B (3 talks each) |

*Saturday May 25*

|              |  |
|--------------|--|
| 0900 - 09 30 | Plenary 3                                |
| 0945 - 1045  | Parallel Sessions 1A & 2A (3 talks each) |
| 1045 - 1115  | Refreshments break                       |
| 1115 - 1235  | Parallel Sessions 2A & 2B (4 talks each) |
| 1235 - 1400  | Lunch                                    |
| 1400 - 1500  | Parallel Sessions 3A & 3B (3 talks each) |
| 1500 - 1515  | Refreshment break                        |
| 1515 - 1545  | Plenary 4                                |
| 1545 - 1600  | Break                                    |
| 1600 - 1700  | Parallel Session 4A & 4B (3 talks each)  |

# Friday May 24

## Day 1: Plenary Session (QNC 0101)

| Time      | Speaker           | Title   |
|-----------|-------------------|---|
| 0845-0900 | R Mann, H Kunduri | Opening Remarks                                   |
| 0900-0930 | Saeed Rastgoo     | Quantization of black holes: LQG, GUP, and beyond |
| 0930-0945 | <b>Break</b>      |   |

## Day 1: Parallel Session 1A (QNC 0101)

| Time      | Speaker            | Title   |
|-----------|--------------------|---|
| 0945-1005 | Sergey Sibiryakov  | Theoretical status of quantum gravity with anisotropic scaling      |
| 1005-1025 | Viqar Husain       | Quantum gravitational collapse as a Dirac particle on the half-line |
| 1025-1045 | Jonathan Barenboim | Evaporating non-singular black holes in 2D gravity                  |

## Day 1: Parallel Section 1B (IQC 1204)

| Time      | Speaker           | Title   |
|-----------|-------------------|---|
| 0945-1005 | Richard Mackenzie | Edge states and their cousins in an open SSH model  |
| 1005-1025 | Greg van Anders   | Bottom-up problems treated with inverse methods are still not top-down: Controlling entropy in complex-structured materials and beyond. |
| 1025-1045 | Ayana Sarkar      | GinOE-GinUE crossover in correlated disordered non-hermitian spin chains  |

**1045-1115 Coffee Break**

Day 1: Section 2A (QNC 0101)

| Time      | Speaker              | Title   |
|-----------|----------------------|---|
| 1115-1135 | Adam Teixido Bonfill | Experimental Entanglement Harvesting: Bridging the gap between theory and experiments |
| 1135-1155 | Lana Bozanic         | Correlation harvesting between particle detectors in uniform motion                   |
| 1155-1215 | Ruhi Shah            | Measuring gravity with spin-spin coupling   |
| 1215-1235 | Caroline Lima        | Unruh phenomena and thermalization for qudit detectors                                |

Day 1: Parallel Section 2B (IQC 1204)

| Time      | Speaker        | Title   |
|-----------|----------------|---|
| 1115-1135 | Manu Paranjape | Fractional Skyrmions  |
| 1135-1155 | Paul Balduf    | Weighted Monte-Carlo sampling of Feynman graphs in $\phi^4$ -theory   |
| 1155-1215 | Maryam Bibi    | Exploring Rare B-Decay: Analyzing Effective Vertices without Unitarity Condition using Mathematica                      |
| 1215-1235 | Yingtao Yang   | The Theory of Electrodynamical Spacetime Relativity: An attempt to inherit and develop the special theory of relativity |

**1235-1400 Lunch**

Day 1: Parallel Session 3A (QNC 0101)

| Time      | Speaker                 | Title   |
|-----------|-------------------------|---|
| 1400-1420 | Raquel Izquierdo Garcia | Exact results for surface operators in $\mathcal{N} = 4$ super Yang-Mills |
| 1420-1440 | Ming Zhang              | Quantum Charged Black Holes   |
| 1440-1500 | Jacqueline Caminiti     | Holographic scattering and non-minimal RT surfaces                        |

Day 1: Parallel Session 3B (IQC 1204)

| Time      | Speaker       | Title                                      |
|-----------|---------------|--|
| 1400-1420 | Ivan Booth    | Dissolving a black hole                    |
| 1420-1440 | Matin Tavayef | Distorted static black holes with a bubble |
| 1440-1500 | Jonas Murieka | TBA  |

**1500-1515 Coffee Break**

Day 1 Plenary Session (QNC 0101)

| Time      | Speaker         | Title   |
|-----------|-----------------|---|
| 1515-1545 | Philippe Landry | Neutron star science with gravitational waves |

**1545-1600 Mental Break**

### Day 1: Parallel Session 4A (QNC 0101)

| <b>Time</b> | <b>Speaker</b>              | <b>Title</b>  |
|-------------|-----------------------------|---|
| 1600-1620   | Luca Marchetti              | Scalar cosmological perturbations from quantum-gravitational entanglement |
| 1620-1640   | Irfan Javed                 | Entanglement production through a cosmological bounce                     |
| 1640-1700   | Cendikiawan<br>Suryaatmadja | Quantum Signature of Black Holes in Quantum Superposition                 |

### Day 1: Parallel Section 4B (IQC 1204)

| <b>Time</b> | <b>Speaker</b> | <b>Title</b>   |
|-------------|----------------|--|
| 1600-1620   | Robert Mann    | A New Look at Quark Stars  |
| 1620-1640   | Michael Gammon | Charged Quark Stars in Regularized 4D Einstein-Gauss-Bonnet Gravity    |
| 1640-1700   | Aditya Chugh   | Studying Dark Photon-Photon oscillations in astrophysical environments |

**End of Day 1**

# Saturday May 25

## Day 2: Plenary Session (QNC 0101)

| Time      | Speaker      | Title                          |
|-----------|--------------|--------------------------------|
| 0900-0930 | Sizheng Ma   | Cauchy-characteristic matching |
| 0900-0930 | <b>Break</b> |                                |

## Day 2: Parallel Session 1A (QNC 0101)

| Time      | Speaker                   | Title   |
|-----------|---------------------------|---|
| 0945-1005 | Lakshay Goel              | Accelerated detector in a superposed spacetime                      |
| 1005-1025 | Maria Rosa Preciado-Rivas | A quantum detector freely falls into a three-dimensional black hole |
| 1025-1045 | Sijia Wang                | Freely Falling UDW Detector in Rotating BTZ Spacetime               |

## Day 2: Parallel Section 1B (IQC 1502)

| Time      | Speaker         | Title   |
|-----------|-----------------|---|
| 0945-1005 | Hubert de Guise | Many-particle representations of $SU(1, 1)$ and the orthogonal group. |
| 1005-1025 | Amit Anand      | Non-linearity and chaos in the quantum kicked top                     |
| 1025-1045 | Juan Margalef   | Generalized Husain-Kuchar models in manifolds with boundaries         |

## 1045-1115 Coffee Break

Day 2: Parallel Section 2A (QNC 0101)

| Time      | Speaker                 | Title   |
|-----------|-------------------------|---|
| 1115-1135 | Marina Maciel Ansanelli | Distinguishing Underlying Causal Explanations from Statistical Data                           |
| 1135-1155 | David Amaro Alcala      | Randomised benchmarking for universal qudit gates   |
| 1155-1215 | Carlo Maria Scandolo    | Choi-defined resource theories  |
| 1215-1235 | Amir Arqand             | Generalized Renyi entropy accumulation theorem and generalized quantum probability estimation |

Day 2: Parallel Section 2B (IQC 1502)

| Time      | Speaker              | Title  |
|-----------|----------------------|--|
| 1115-1135 | Michael Gennari      | How to improve CKM unitarity bounds with nuclear theory              |
| 1135-1155 | Georgios Palkanoglou | Exotic nuclear superfluidity in heavy nuclei                         |
| 1155-1215 | Lotta Jokiniemi      | Neutrinoless double-beta decay and how to probe it with muon capture |
| 1215-1235 | Ryan Curry           | Second order perturbation theory in quantum Monte Carlo              |

**1235-1400 Lunch**

Day 2: Parallel Session 3A (QNC 0101)

| Time      | Speaker             | Title  |
|-----------|---------------------|--|
| 1400-1420 | Shohreh Abdolrahimi | Quantum Fields near Black Holes and Black Holes Evaporation  |
| 1420-1440 | Joanna Karczmarek   | Lorentzian spacetimes in the IKKT model  |
| 1440-1500 | Mengqi Lu           | Lagrangian Partition Functions Subject to a Fixed Spatial Volume Constraint in the Lovelock Theory |

Day 2: Parallel Session 3B (IQC 1502)

| Time      | Speaker         | Title  |
|-----------|-----------------|--|
| 1400-1420 | Jiayue Yang     | Dynamic behaviours of black hole phase transitions near quadruple points     |
| 1420-1440 | Valerio Faraoni | More on the first-order thermodynamics of scalar-tensor gravity              |
| 1440-1500 | Shreya Dhar     | Classification of Nilpotent and Solvable Lie Algebras of $sl(n, \mathbb{C})$ |

**1500-1515 Coffee Break**

Day 2 Plenary Session (QNC 0101)

| Time      | Speaker            | Title                  |
|-----------|--------------------|------------------------|
| 1515-1545 | Geremia Massarelli | Ph.D Thesis Prize talk |

**1545-1600 Mental Break**



Day 2: Parallel Session 4A (QNC 0101)

| <b>Time</b> | <b>Speaker</b>    | <b>Title</b>   |
|-------------|-------------------|--|
| 1600-1620   | Mustafa Amin      | On Some Classical Features of Quantum Mechanics                                      |
| 1620-1620   | Shlok Ashok Nahar | Improved de Finetti reductions with applications to optical quantum key distribution |

Day 2: Parallel Section 4B (IQC 1502)

| <b>Time</b> | <b>Speaker</b>               | <b>Title</b>  |
|-------------|------------------------------|---|
| 1600-1620   | Billy Sievers                | MOTS in Kruskal-Schwarzschild-AdS                                   |
| 1620-1640   | Amirhossein<br>Dehghanizadeh | Bouncing cosmology; a solution to the singularity problem and more. |

Day 2: Main session (QNC 0101)

| <b>Time</b> | <b>Speaker</b>  | <b>Title</b>   |
|-------------|-----------------|--|
| 1640-1700   | Turkuler Durgut | A Beginner's Struggle: How to incorporate EDI into teaching theoretical physics? |