Master your Physics



Report of Contributions

Contribution ID: 1

Type: not specified

The Universe in a Stream: Challenges and Progress of the ALeRCE Broker

Monday 14 June 2021 17:00 (2 hours)

A new generation of large aperture and large field of view telescopes is allowing us to explore large volumes of the Universe in an unprecedented fashion. This has led to the discovery of new populations of astrophysical events or new phases of evolution of known objects. In order to take advantage of these new telescopes a new time domain ecosystem is developing. Among the tools required for this new ecosystem are fast machine learning aided discovery and classification algorithms, interoperable tools that allow for an effective communication between brokers and follow-up telescopes for rapid reaction, and new models and tools to extract the most physical knowledge from these observations. In this talk I will review the challenges and progress of building one of these systems: the Automatic Learning for the Rapid Classification of Events (ALERCE) astronomical alert broker. ALeRCE (http://alerce.science/) is a new alert annotation and classification system led by an interdisciplinary and interinstitutional group of scientists from Chile and the US. ALERCE is focused around different scientific cases: stellar explosions, variable stars, supermassive black holes, and asteroids. I will discuss some of the challenges associated with the problem of alert classification, including the ingestion, annotation, database management, training set building, distributed processing, machine learning classification and visualization, or the challenges of working in large interdisciplinary teams. I will show some results based on the real-time ingestion and classification using the Zwicky Transient Facility (ZTF) alert stream as input, as well as some of the tools available. In about one year of operations we have ingested more than 120 million alerts, classified about 30 million objects based on their images, classified about one million objects based on their light curves, and reported more than 4000 supernova candidates.

Presenter: FÖRSTER, Francisco

Contribution ID: 2

Type: not specified

Discussion session: Interpretation of Quantum Mechanics

Monday 14 June 2021 19:00 (2 hours)

In The Messenger Lectures, 1964 at MIT, Feymnan said, "There might have been a time when only one man knew the theory of relativity, because he was the only guy who caught on, before he wrote his paper. But after people read the paper a lot of people understood the theory of relativity in some way or other. On the other hand, I think I can safely say that nobody understands quantum mechanics. I am going to tell you what nature behaves like. If you will simply admit that maybe she does behave like this, you will find her a delightful, entrancing thing. Do not keep saying to yourself, if you can possibly avoid it, "But how can it be like that?" because you will get 'down the drain', into a blind alley from which nobody has escaped."Back in 2021, we want to know if it is possible to escape from the blind alley if you do go 'down the drain'. This is precisely the aim of our panel discussion on "The Interpretations of Quantum Mechanics". Masters students, you can finally ask all of your doubts you have had on the nature of the wavefunction to the veteran dragon slayers who have ventured far and deep into these dark dungeons, our panelists for this session.

Presenters: ROVELLI, Carlo; MULLER, F.A.; VAN WEZEL, Jasper

Quantum Gravity, where are we?

Contribution ID: 3

Type: not specified

Quantum Gravity, where are we?

Monday 14 June 2021 15:00 (2 hours)

Recent (and forthcoming) empirical evidence helps us focus quantum gravity research. Loop quantum gravity is a concrete possibility for a theoretical description of quantum spacetime. I discuss its ideas, results and open issues and the perspectives to connect it to observation.

Presenter: ROVELLI, Carlo

Opening Ceremony

Contribution ID: 4

Type: not specified

Opening Ceremony

Monday 14 June 2021 14:45 (15 minutes)

Presenter: VAN WEZEL, Jasper

ITER – The Way to New Energy

Contribution ID: 6

Type: not specified

ITER – The Way to New Energy

Tuesday 15 June 2021 09:00 (2 hours)

Fusion is the energy that powers the sun and the stars. Imagine we manage to harness this energy down here on earth –for the benefit of mankind?

With the ITER project, 35 nations have joined their forces to form the world's largest International scientific collaboration. It's goal: to prove that fusion energy is feasible, that we have the knowledge, the technologies and the materials to deliver fusion energy to the grid.

Presenter: GRACIAS, William

Master your Ph ··· / Report of Contributions

Ph.D. morning: Gravitation and …

Contribution ID: 7

Type: not specified

Ph.D. morning: Gravitation and Astroparticle Physics

Tuesday 15 June 2021 12:00 (2 hours)

Presenters: JUNG, Bouke; GAEMERS, Peter; BHARDWAJ, Uddipta

Interaction Time

Contribution ID: 8

Type: not specified

Interaction Time

Tuesday 15 June 2021 11:00 (1 hour)

Master your Ph ··· / Report of Contributions

Ph.D. afternoon: Advanced Matt

Contribution ID: 9

Type: not specified

Ph.D. afternoon: Advanced Matter and Energy Physics

Tuesday 15 June 2021 14:00 (2 hours)

Presenters: LERICHE, Cyrian; HENKE, Jans; SCHRAMMA, Nico

Interaction Time

Contribution ID: 10

Type: not specified

Interaction Time

Tuesday 15 June 2021 16:00 (1 hour)

Artificial Intelligence and High-…

Contribution ID: 11

Type: not specified

Artificial Intelligence and High-Energy Physics

Tuesday 15 June 2021 17:00 (2 hours)

Recent advances in artificial intelligence have had an outsized impact on many scientific fields, and high-energy physics is no exception. What is special about high-energy physics, though, is the vast amount of theoretical and experimental knowledge that we already have about many problems in the field. In this talk, I draw on examples from collider phenomenology and quantum chromodynamics to highlight the fascinating interplay between theoretical principles and machine learning strategies.

Presenter: THALER, Jesse

Conversations on the Leaky Pipe ...

Contribution ID: 12

Type: not specified

Conversations on the Leaky Pipeline (Amsterdam only)

Tuesday 15 June 2021 19:00 (2 hours)

In many professional areas, a career pathway can be pictured as a pipeline. In science, technology, engineering and mathematics (STEM), this pipeline is leaking. Minority groups and women are less represented at every higher level of academia. Unfortunately, the FNWI is no exception to this, but the situation is improving!

Together with our knowledgeable panel, we will address the topic along the lines of gender diversity in physics. We will talk about:

- Why diversity is important

- What are the major causes for a lack of gender diversity in physics at increasingly higher levels of academia

- What solutions do we have and what is already being done

To approach these sensitive topics with a certain degree of confidentiality, this session will be reserved exclusively for Amsterdam students and staff. Every member of the audience will be asked to respect the code of conduct, laid out at the beginning of the session. Moreover, neither recordings nor late entries will be permitted.

Presenters: CANDIAN, Alessandra; VERHEIJDEN, Evita; NEWELL, Katerina; KEESTRA, Machiel; VAN DER HOEK, Pieter

Gamma-ray astrophysics in a ···

Contribution ID: 13

Type: not specified

Gamma-ray astrophysics in a multi-messenger context

Wednesday 16 June 2021 09:00 (2 hours)

I will illustrate the relevance of the science of gamma-ray astrophysics and its connection to other messengers. I will explain the principle of detection and illustrate current large research infrastructures and their scientific reach. I will then connect it to other multi-messenger experiments such as IceCube using neutrinos and gravitational wave observations.

Presenter: MONTARULI, Teresa

Quantum supreme matter and the …

Contribution ID: 14

Type: not specified

Quantum supreme matter and the strange metals.

Wednesday 16 June 2021 11:00 (2 hours)

Qauntum supreme matter refers to forms of matter that are densely many-body entangled with the ramification that the quantum supremacy of the quantum computer is required to enumerate the way it works. The evidence is mounting that the AdS/CFT correspondence of the string theorist, augemented by progress with SYK type models, yields a mathematical view on generic properties of such states of matter. Guided by these insights, substantial progress has been made in recognizing various of these traits in experiments on the strange metal states of the high Tc superconductors.

Presenter: ZAANEN, Jan

Interaction Time

Contribution ID: 15

Type: not specified

Interaction Time

Wednesday 16 June 2021 13:00 (1 hour)

Ph.D. afternoon: Biophysics & Bi

Contribution ID: 16

Type: not specified

Ph.D. afternoon: Biophysics & Biophotonics

Wednesday 16 June 2021 14:00 (2 hours)

Presenters: MEIJERING, Anna; VAN HUIZEN, Laura; VASELLI, Margherita

Ph.D. afternoon: Science for Ener ····

Contribution ID: 17

Type: not specified

Ph.D. afternoon: Science for Energy and Sustainability

Wednesday 16 June 2021 16:00 (1 hour)

Presenter: HAMANS, Ruben

Are we living in the matrix?

Contribution ID: 18

Type: not specified

Are we living in the matrix?

Wednesday 16 June 2021 17:00 (2 hours)

No. Obviously not. It's a daft question. But, buried beneath this daft question is an extremely interesting one: is it possible to simulate the known laws of physics on a computer? Remarkably, there is a mathematical theorem, due to Nielsen and Ninomiya, that says the answer is no. I'll explain this theorem, the underlying reasons for it, and some recent work attempting to circumvent it.

Presenter: TONG, David

Contribution ID: 19

Type: not specified

The Future of Fundamental Physics (Hosted by Delta ITP)

Wednesday 16 June 2021 19:00 (2 hours)

The reports of the death of physics are greatly exaggerated. Instead, I would argue, we are living in a golden era and the best is yet to come. Not only did the past decades see some amazing breakthrough discoveries and show us the many unknowns in our current understanding, but more importantly, science in general is moving from studying 'what is'to 'what could be.'There will be many more fundamental laws of nature hidden within the endless number of physical systems we could fabricate out of the currently known building blocks. This demands an open mind about the concepts of unity and progress in physics.

Presenter: DIJKGRAAF, Robbert

Gravitational waves and fundam \cdots

Contribution ID: 20

Type: not specified

Gravitational waves and fundamental physics

Thursday 17 June 2021 10:00 (3 hours)

Presenters: KOEKOEK, Gideon; HILD, Stefan

Interaction Time

Contribution ID: 21

Type: not specified

Interaction Time

Thursday 17 June 2021 13:00 (1 hour)

Ph.D. afternoon: Theoretical Physics

Contribution ID: 22

Type: not specified

Ph.D. afternoon: Theoretical Physics

Thursday 17 June 2021 14:00 (2 hours)

Presenters: DUASO PUEYO, Carlos; VERHEIJDEN, Evita

Interaction time

Contribution ID: 23

Type: not specified

Interaction time

Thursday 17 June 2021 16:00 (1 hour)

Contribution ID: 24

Type: not specified

Topological valleytronics in bilayer graphene

Thursday 17 June 2021 17:00 (2 hours)

The valley isospin degrees of freedom in 2D hexagonal lattices offers a pathway to explore manybody ground states and novel paradigms of electronic applications. It is analogous to electron spin however coupling to an electric field offers a powerful control knob that is nimble and compatible with many device architectures. In this talk, I will describe how we create valley-momentum locked topological 1D channels in Bernal stacked bilayer graphene by electrically generating inverted band structures. This all-electric construction gives us the ability to realize reconfigurable ballistic waveguides and device operations that explicitly explore the valley-momentum locking of the 1D channels. I will show the working of a topological valley valve, which does not require valley-polarized current to operate but relies on the control of topology, and a continuously tunable electron beam splitter. Time permitting I will touch upon a few recent development in our lab where new physics emerges from exploring the valley isospin in the fractional quantum Hall effect.

Presenter: ZHU, Jun

Contribution ID: 25

Type: not specified

Conversations on a Healthy Work Environment (Amsterdam only)

Thursday 17 June 2021 19:00 (2 hours)

Despite many students and academics experiencing issues related to mental health at some point during their career, few people dare to open up about their struggles. As a consequence of this stigma, some people hesitate to actively seek the help they might need - even though the FNWI offers an extensive support system.

Together with our panel, we will try to lead an open and honest conversation about common mental health issues in academia. Our ultimate goal will be to de-stigmatise the topic of mental health and to foster a healthier work environment among students and staff. In particular, we will talk about:

- High Performance Pressure & Work-Life-Balance
- · Coping with Learning Differences and Difficulties
- Effects of the Covid Pandemic on Learning and Mental Health

To approach these sensitive topics with a certain degree of confidentiality, this session will be reserved exclusively for Amsterdam students and staff. Every member of the audience will be asked to respect the code of conduct, laid out at the beginning of the session. Moreover, neither recordings nor late entries will be permitted.

Presenters: VAN DER SCHAAR, Jan Pieter; VAN MAMEREN, Joost; RIETH, Lizzy; BIRSAK, Mailis; BETTAQUE, Valerie

Variational Quantum Simulation

Contribution ID: 26

Type: not specified

Variational Quantum Simulation

Friday 18 June 2021 09:00 (2 hours)

Key properties of condensed matter systems, such as for instance the occurrence of high-temperature superconductivity, are governed deep down by fundamental quantum effects such as superposition, interference and entanglement. Likewise, molecular structure calculations that could help explain and understand chemical reaction rates (with tremendous industrial impact) also require a full quantum description.

However, the complexity of simulating quantum systems notoriously scales exponentially with the number of elementary constituents. A possible solution to this problem is quantum simulation: use one quantum system, to simulate another. A well-controlled quantum system is built in the laboratory that mimics the system under study. The hope is that such devices can open up unexplored territory outside the reach of classical numerical simulations, and provide new insights into quantum matter.

In this talk we discuss experimental quantum simulation (and quantum computation) platforms built from ultracold atoms and ions. We will discuss an example of a current research direction of variational quantum simulation, where a computer is hooked up to a quantum experiment and in a feedback loop attempts to variationally create interesting quantum states.

Presenter: VAN BIJNEN, Rick

Interaction Time

Contribution ID: 27

Type: not specified

Interaction Time

Friday 18 June 2021 11:00 (1h 30m)

Ph.D. afternoon: Astronomy and \cdots

Contribution ID: 28

Type: not specified

Ph.D. afternoon: Astronomy and Astrophysics

Friday 18 June 2021 12:30 (2 hours)

Presenters: DERKINK, Annelotte; CHOUDHURY, Devarshi; VISSER, Rico

Interaction Time

Contribution ID: 29

Type: not specified

Interaction Time

Friday 18 June 2021 14:30 (30 minutes)

Thermodynamics of the human mind

Contribution ID: 30

Type: not specified

Thermodynamics of the human mind

Friday 18 June 2021 15:00 (2 hours)

Humans learn not only disconnected bits of information, but complex interconnected networks of relational knowledge. The capacity for such learning naturally depends on the architecture of the knowledge network itself. I will describe recent work assessing network constraints on the learnability of relational knowledge, and a free energy model (drawing on principles of thermodynamics) that offers an explanation for such constraints. I will then broaden the discussion to the generic manner in which humans communicate using systems of interconnected stimuli or concepts, from language and music, to literature and science.

Presenter: BASSETT, Danielle

Discussion Session: The Future of \cdots

Contribution ID: 31

Type: not specified

Discussion Session: The Future of Energy

Friday 18 June 2021 17:00 (2 hours)

The climate emergency is, without a doubt, THE challenge of our generation. The only way to overcome this issue is through a revolution: a shift in the collective mindset. For this revolution to happen, we need to exchange new ideas and excite young minds to stand up to the challenge. This is exactly the aim of our panel discussion on "The future of energy", where we will discuss the current status on sustainability and we will address several crucial topics ranging from the physics of new energy sources to the role of education in a sustainable society.

Presenters: VAN MARSEVEEN, Jan; FRESE, Raoul; STERL, Sebastian Hendrik

Entanglement, Complexity, and S ...

Contribution ID: 32

Type: not specified

Entanglement, Complexity, and Spacetime

Friday 18 June 2021 19:00 (2 hours)

The two things that make quantum physics so different from classical physics are the phenomenon of entanglement and a vastly larger capacity for complexity. Both of these play a profound role in understanding how smooth large-scale spacetime emerges from the principles of quantum mechanics. I'll explain what these connections mean and how they were discovered.

Presenter: SUSSKIND, Leonard