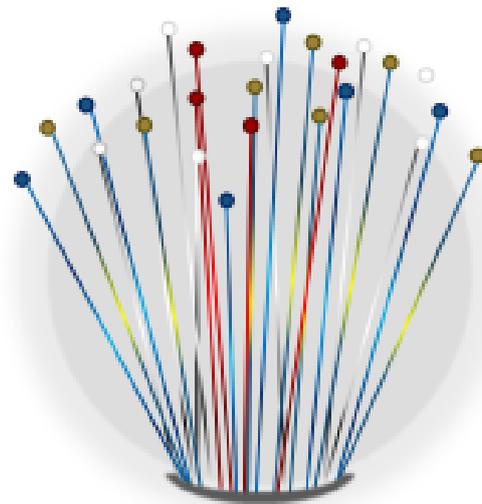


# Fourth Conference of Nordic Network for Diversity in Physics



Nordic Network for  
Diversity in Physics

## Report of Contributions

Contribution ID: 1

Type: **not specified**

## Registration

*Thursday, 18 August 2022 12:30 (30 minutes)*

Contribution ID: 3

Type: **not specified**

## Posters - Reception

*Thursday, 18 August 2022 17:00 (1 hour)*

Contribution ID: 4

Type: **not specified**

## Public talk: CERN, LHC and the Higgs

*Thursday, 18 August 2022 18:00 (1h 30m)*

Twelve countries founded CERN - the European Laboratory for Particle Physics - in 1954. Since then it has grown into a scientific melting pot where thousands of physicists from all over the world work together to uncover what the universe is made of and how it works. Ten years ago, the ATLAS and CMS experiments at CERN's Large Hadron Collider (LHC) discovered the Higgs boson, a central ingredient in the standard model of particle physics. The LHC has now started its third run after a period of extensive upgrades. The new data will allow the physicists to search for the physics beyond the standard model that is needed to explain for instance the dark matter in the universe and the asymmetry between matter and antimatter.

**Presenter:** ASMAN, Barbro (Stockholm University (SE))

Contribution ID: 5

Type: **not specified**

## Dinner

*Thursday, 18 August 2022 19:30 (2 hours)*

Contribution ID: 6

Type: **not specified**

## **Key note: How to tackle resistance against gender equality in a hostile environment**

*Thursday, 18 August 2022 13:15 (1 hour)*

I will analyze the struggle with gender equality resistance from the perspective of social movements studies, specifically as a reaction to a feminist social change. As a feminist and a queer activist, I will also present examples of tackling this resistance in a hostile Polish context. Drawing from personal experience and scientific literature, I will suggest some strategies we could use to resist the resistance on a social and individual level.

**Presenter:** Prof. BIELSKA, Beata (Nicolaus Copernicus University in Toruń, PL)

**Session Classification:** Session 1

Contribution ID: 7

Type: **not specified**

## Welcome

*Thursday, 18 August 2022 13:00 (15 minutes)*

Contribution ID: 8

Type: **not specified**

## Panel discussion

*Friday, 19 August 2022 14:40 (1 hour)*

Moderator: Tomas Brage; Participants: Beata Bielska, Carole Mundell, Eija Tuominen, Þorgerður J. Einarsdóttir.

**Presenters:** Prof. BIELSKA, Beata (Nicolaus Copernicus University, Poland); Prof. MUNDELL, Carole (University of Bath, UK); TUOMINEN, Eija (Helsinki Institute of Physics (FI)); BRAGE, Tomas; Prof. EINARSDÓTTIR, Þorgerður J. (University of Iceland); ASMAN, Barbro (Stockholm University (SE))

Contribution ID: 9

Type: **not specified**

## Wrap up

*Friday, 19 August 2022 16:15 (1 hour)*

Contribution ID: 10

Type: **Talk**

## **Climate change: from physics to social and behavioural sciences**

*Thursday, 18 August 2022 14:15 (30 minutes)*

**Presenter:** LAURI, Katja Anniina (University of Helsinki)

**Session Classification:** Session 1

Contribution ID: 11

Type: **Talk**

## The physics of Space Weather

*Thursday, 18 August 2022 14:45 (30 minutes)*

Space weather chain consist of many components connecting phenomena from the Sun which propagate in the interplanetary and near-Earth's space with the ground. Forecasting the potential space weather hazards has become vital in our everyday life because today we are completely dependent on undisrupted operations of human technology in orbit and on the ground. Each component of space weather has a different time scale and impacts a different technology. Therefore, predicting space weather effects is very demanding and requires a wide range of spacecraft and ground instrumentation for observations, collaborative effort of scientists with different expertise as well as active involvement and feedback from end-users. Despite these challenges, space weather became increasingly popular not only among the researchers doing space physics but also in astrophysics community where it finds application, for example to the environments of exoplanets. In addition, the space weather community is a good of example for better gender balance, where female colleagues can be found over the entire spectrum of career stages including many in leading positions worldwide.

**Presenter:** YORDANOVA, Emiliya (Swedish Institute of Space Physics, Uppsala)

**Session Classification:** Session 1

Contribution ID: 12

Type: **Talk**

## Gravothermal collapse in self-interacting dark matter halos

*Thursday, 18 August 2022 15:45 (15 minutes)*

The Cold Dark Matter model is highly successful at explaining observations of the large-scale structure of the Universe. However, it has challenges in matching observations on small scales, in the regime of dwarf galaxies. Observationally, these challenges have been established more convincingly for dwarf galaxies in the Local Group, and particularly within the Milky Way. Simulations with velocity-dependent self-interacting dark matter (SIDM) model showed that cross-sections  $\sigma \sim \text{cm}^2/\text{g}$  at velocities  $\lesssim \text{km/s}$  predict both cuspy, high velocity dispersion subhalos consistent with the ultra-faint dwarf spheroidals and cored, low velocity dispersion subhalos consistent with brighter low-density satellites.

In this talk, I will talk about the velocity-dependent SIDM model presented in Refs. [\cite{Zavala2019,Turner}](#) and follow the gravothermal fluid formalism to explore the consequences of gravothermal collapse for the formation of Intermediate Mass Black Holes in the MW satellite population.

**Presenter:** MESHVELIANI, Tamari (University of Iceland)

**Session Classification:** Session 2

Contribution ID: 13

Type: **not specified**

## Astrophysical transients as cosmological probes

*Thursday, 18 August 2022 16:00 (15 minutes)*

One of the most important cosmological discoveries ever made is that our Universe is expanding, and that this expansion is accelerated. Interestingly, we don't know why! The best model so far describing the evolution of our Universe is primarily dominated by Dark energy, a mysterious force which comprises ~75% of our Universe, and is believed to cause the expansion. Additionally, measurements of the rate of expansion of the Universe, called the Hubble constant, made using nearby stars and galaxies are inconsistent with those determined using signatures from the faraway Universe- a mind-bending problem in current cosmology called the 'Hubble Tension'. Solving these puzzles is imperative to comprehend the origin, age, evolution, and ultimately the fate of our Universe.

I will take about my PhD and current research which focuses on advancing the standardization of various types of explosive transients such as supernovae Type Ia (SNe Ia), superluminous supernovae (SLSNe)

and Kilonovae (KNe). I develop new methods for using these stellar explosions to measure cosmological

distances and evaluating the rate of expansion of our Universe i.e. the Hubble constant.

I will briefly present recent results for each of these transients and discuss some future perspectives.

**Presenter:** KHETAN, Nandita (DARK Cosmology centre, Niels Bohr Institute, University of Copenhagen)

**Session Classification:** Session 2

Contribution ID: 14

Type: **not specified**

## Lessons from the geometric structure of black holes

*Thursday, 18 August 2022 16:15 (30 minutes)*

Black holes are an extremely fruitful playground for theoretical physicists, allowing one to address complex questions about the nature of reality, such as the information paradox, quantum entanglement, and even the use of black holes as a proxy for a quantum field theory in flat space. Here we discuss what we can learn solely from the mathematical structure of certain black holes in a negatively curved spacetime. We will see that we can determine the quasinormal modes of these spacetimes, thereby translating the classic question “Can you hear the shape of a drum?” to “Can you hear the shape of spacetime?”. We will discuss applications to warped black hole geometries as well as Kerr black holes (those black holes observed by the Event Horizon Telescope).

**Presenter:** MARTIN, Victoria L. (University of Iceland)

**Session Classification:** Session 2

Contribution ID: 15

Type: **not specified**

## North American Efforts in Diversity in Physics: Undergraduate Conferences, Local Graduate Committees and Summer Camps

*Thursday, 18 August 2022 16:45 (15 minutes)*

Universities and national labs in North America have, in recent years, increased the level of activities supporting and promoting diversity in the field of physics, bringing together minority groups for educational and inspirational conferences, discussion panels and summer camps. In this work, I summarise different types of programs I have been involved in (both as the main organiser and as a volunteer) over the past 5 years.

Two summer camps have been organized targeting girls attending local schools from age 10-18, where each camp provided diverse activities such as lab visits, design projects, scientific/presentation skills workshops etc. The goal of these camps was to provide a general overview of what it is like to pursue science as further studies, where all volunteers in the camps were current physics students/researchers/professors and assisted campers throughout the camp.

CCUWiP (Canadian Conference for Undergraduate Women in Physics) 2018 welcomed over 100 participants of all genders in Canada. The speakers came from diverse backgrounds, including NASA engineers and medical physicists. The conference focused on what it means to be in a minority group pursuing a career related to physics: life outside of academia/work, social expectations, the importance role models etc. The goal, successfully fulfilled, was to provide tools and raise awareness on the road ahead in a physics career.

Furthermore, small efforts include diversity panels and round-table discussions were regularly organised at my home university (Queen's University, Canada) to raise and encourage discussions among students and researchers on various topics such as dealing with stress and gender/racial imbalance in physics.

Overall, schools and labs in North America put a large amount of effort into increasing diversity in physics. I hope to extend these efforts and implement the ideas inspired by previous experiences to the Nordic countries.

**Presenter:** CAO, Gevy Jiawei (University of Oslo)

**Session Classification:** Session 2

Contribution ID: 16

Type: **Talk**

## **On the status of women in physics in Norway - goals, statistics, and some open questions**

*Friday, 19 August 2022 10:00 (20 minutes)*

**Primary author:** FREDRIKSEN, Åshild (The Arctic University of Norway, NO)

**Presenter:** FREDRIKSEN, Åshild (The Arctic University of Norway, NO)

**Session Classification:** Session 3

Contribution ID: 17

Type: **not specified**

## **Examples on the Gender and Physics work in Sweden**

*Friday, 19 August 2022 10:20 (20 minutes)*

**Primary author:** BRAGE, Tomas

**Presenter:** BRAGE, Tomas

**Session Classification:** Session 3

Contribution ID: 18

Type: **not specified**

## **Is science gender-neutral or clueless of gender? Moving beyond simple questions and answers**

*Friday, 19 August 2022 10:40 (20 minutes)*

Previously, the focus of gender in science, in terms of the STEM fields, was mainly on numbers and the problem of underrepresentation of women in these disciplines. While this continues to be of great importance, issues of the content of the disciplines and the gendered culture of science are gaining more interest. The presentation addresses the some of the questions in the gender and science debate and the complexity surrounding the issue, based on European projects that the University of Iceland has participated in.

**Presenter:** Prof. EINARSDÓTTIR, Þorgerður J. (University of Iceland)

**Session Classification:** Session 3

Contribution ID: 19

Type: **not specified**

## **Bacteria vs Phages: The art of war among unseen majority**

*Friday, 19 August 2022 11:30 (30 minutes)*

A virulent phage (virus that infects bacteria) infection to a host bacterial cell results in lysis of the cell, where hundreds of phage particles are released after a latency time. Therefore, phages are one of the biggest threats. The phage pressure is believed to be an important factor in shaping the microbial communities and a driving force of their evolution, and yet we are far from having a full picture of their warfare. In this talk, I highlight a few factors that play significant roles in phage-bacteria interactions and their coexistence, especially the importance of the spatial structure in a few cells scale to the colony scale.

**Presenter:** MITARAI, Namiko (Niels Bohr Institute)

**Session Classification:** Session 4

Contribution ID: 20

Type: **not specified**

## Collider physics and the Early Universe

*Friday, 19 August 2022 12:00 (30 minutes)*

The Standard Model of particle physics is an extremely successful theory predicting experimental outcomes with outstanding accuracy. Its last particle, the Higgs boson, was experimentally observed 10 years ago by ATLAS and CMS experiments at the LHC and has been studied with increased accuracy since then. Yet, all the particles of the Standard Model make only 5% of matter-energy budget of the observable Universe. The Standard Model does not give an explanation why even this 5% exists. Moreover, the Higgs boson seems to have “set” the vacuum of our Universe in an energetically metastable state. The low value of now precisely measured Higgs boson mass, also remains a mystery from a theory point of view.

Proton-proton collisions at the Large Hadron Collider recreate conditions from a less of a picosecond after the Big Bang. The Run 3 of the LHC has just started and will bring unprecedented amount of data. Can we understand the Early Universe from the measurements at the LHC and elucidate some of the mysteries of the Universe today?

**Presenter:** LIPNIACKA, Anna (University of Bergen (NO))

**Session Classification:** Session 4

Contribution ID: 21

Type: **not specified**

## **Denmark, moving beyond the gender fatigue**

*Friday, 19 August 2022 13:30 (20 minutes)*

**Presenter:** Prof. GALL, Christa (University of Copenhagen, DK)

**Session Classification:** Session 5

Contribution ID: 22

Type: **not specified**

## The Equality Paradox in Finnish Physics

*Friday, 19 August 2022 13:50 (20 minutes)*

**Primary author:** Dr TUOMINEN, Eija (Helsinki Institute of Physics (FI))

**Presenter:** Dr TUOMINEN, Eija (Helsinki Institute of Physics (FI))

**Session Classification:** Session 5

Contribution ID: 23

Type: **not specified**

## Choice narratives of “unexpected” physics students

*Friday, 19 August 2022 14:10 (15 minutes)*

Higher education physics has long been a field with a disproportionately skewed representation in terms of gender, class, and ethnicity. Responding to this challenge, this study explores the trajectories into higher education physics, with a particular focus on “unexpected” physics students. Drawing on semi-structured timeline-guided interviews with 20 students enrolled in university physics programmes across Sweden, we analyze the students’ accounts of their trajectories into physics as “choice narratives” (Holmegaard, 2015) and as “narratives of location” (Anthias, 2005). We ask which choice narratives are used, and how these become (im)possible and legitimate in relation to narratives of location and wider societal discourses.

In line with earlier research, many of our interviewees describe a fascination for science and for understanding the world, often described as established already in childhood. When growing up in a supporting academically oriented family, cultivating an interest in physics often becomes an obvious and easy path, and this is the case for many of the women in our sample growing up in middle-class families. For others, being given an opportunity to express a passion for science despite family and society not expecting it is an important transformative experience.

Interviewees describe wanting to be challenged and recognized for their performance. Here, physics is seen as a difficult subject, bestowing prestige when mastered. Achieving this kind of recognition can be an expected attainment in middle-class families and striving migrant families, but also a way of proving oneself against all odds for those from a non-academic background.

The choice of physics is also described by some as a possibility to contribute to one’s community. In earlier research, this has not been highlighted as a common motivation for choosing physics, but we find that this is narrated in relation to marginalized class and ethnic positions, and still uncommon among the women with middle-class background. However, some of the women frame the choice of studying physics as a contribution simply because it breaks expectations and may provide a role model for other underrepresented students.

In contrast to the traditional picture of physics as a “pure”, “smart”, and “prestigious” field of study pursued by students interested in understanding how the world works, our results show that alternate ways of approaching physics studies are possible. However, these approaches are both limited and possibilized by the gendered, classed, and racialized locations of prospective students. An opportunity for reconceiving the role of physics for all students, both in and outside school, is given by considering these alternative approaches to the subject.

Anthias, F. (2005). Social Stratification and Social Inequality: Models of Intersectionality and Identity. In F. Devine, M. Savage, J. Scott, & R. Crompton (Eds.), *Rethinking class: culture, identities and lifestyles* (pp. 24–45). Palgrave Macmillan.

Holmegaard, H. T. (2015). Performing a choice-narrative: A qualitative study of the patterns in STEM students’ higher education choices. *International Journal of Science Education*, 37(9), 1454–1477. <https://doi.org/10/gctkn7>

**Presenter:** DANIELSSON, Anna (Stockholm University)

**Session Classification:** Session 5

Contribution ID: 24

Type: **not specified**

## Student's journey in the light of gender differences in engineering

*Friday, 19 August 2022 14:25 (15 minutes)*

The number of women has increased greatly in higher education over the last decades but women are still underrepresented in Science, Technology, Engineering, and Mathematics (STEM) education programs. This gender difference has been reported and analysed, and many recommendations put forward and interventions tried focusing on different issues, but the effects and changes are slow. In our presentation we give an overview of our research on engineering education at Reykjavik University with focus on the student's journey throughout their study, gender difference in engineering students' attitude toward engineering and the development of gender ratio within different engineering study programs during the last decade.

### **References:**

Matthiasdottir, A. and Audunsson, H. (2022). Gender differences in attitudes towards engineering studies and in graduates. Proceedings of the 18th International CDIO Conference, Reykjavik University, Iceland, June 13-15, 2022.

Audunsson, H., Matthíasdóttir, A. and Fridgeirsson, T. V. (2020). Student's journey and personal development in an engineering program. Proceedings of the 16th International CDIO Conference, hosted on-line by Chalmers University of Technology, Gothenburg, Sweden, 8-10 June, 2020.

Matthiasdottir, A. (2018). Gender differences in engineering students'. Choice of Studies. Proceedings at 14th International CDIO Conference, Kanazawa Institute of Technology, Kanazawa, Japan, June 28-July 2, 2018.

Audunsson, H., Sæmundsdottir, I. and Matthiasdottir, Á. (2015). Introduction to Engineering as a two-phase course. Proceedings of the 11th international CDIO conference, Chengdu University of Information Technology, Chengdu, Sichuan, P.R. China, June 8-11, 2015.

**Presenter:** MATTHÍASDÓTTIR, Ásrún (Reykjavik University)

**Session Classification:** Session 5

Contribution ID: 25

Type: **not specified**

## **Key note: Black-hole driven explosions and the dynamic Universe – breaking barriers in the era of multi-messenger astrophysics**

*Friday, 19 August 2022 09:00 (1 hour)*

**Primary author:** Prof. MUNDELL, Carole (University of Bath, UK)

**Presenter:** Prof. MUNDELL, Carole (University of Bath, UK)

**Session Classification:** Session 3