On CERN – SEENET-MTP PhD program

(2015-2018)

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Niš, Serbia

CERN, 23 July 2018

On CERN – SEENET-MTP PhD program (2015-2018)

- The main part - a **series of intense, self-connected, one-week seminars for PhD students**
- In some exceptional cases, Master students as well as young postdocs were included
- Each seminar included several lectures, in about 50% followed by exercises
- It WAS planned to organize 2-3 seminars per year …
- Most of travel and local expenses were covered by CERN in 2015. In 2016, 2017 and 2018 contributions were aproximately shared as follows: CERN (35%), ICTP (30%), EPS (15%), SEENET-MTP and the local nodes (10%), other (10%).
- The selection of students and the coordination of the program were the responsibility of the Program Committee (Giudice, Lerche, Djordjevic, Vulcanov/Rashkov) and the local organizers of the particular events
- ICTP and MPI have been invited to join and support the program …

Agreement - 2017

FRAMEWORK AGREEMENT FOR SCIENTIFIC AND TECHNICAL COLLABORATION

REFERENCE KN3487

(THE "AGREEMENT")

BETWEEN: THE SOUTHEASTERN EUROPEAN NETWORK IN MATHEMATICAL AND THEORETICAL PHYSICS ("SEENET-MTP"), a regional Network located at Niš, Serbia, duly represented by Professor Goran Đorđević, Executive Director,

AND: THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH ("CERN"), an Intergovernmental Organization having its seat at Geneva, Switzerland, duly represented by Professor Gian Giudice, Head of Theoretical Physics Department,

hereinafter "Party" and collectively "Parties".

CONSIDERING:

That CERN, an Intergovernmental Organization, is a leading global laboratory in particle physics, providing for collaboration of a pure scientific and fundamental character, with participation by scientific institutes from all over the world;

That SEENET-MTP, an association of 22 Institutions from 11 European countries, is a leading Network in regional and interregional cooperation in research, training and capacity building in Theoretical and Mathematical Physics;

That the Parties wish to collaborate in domains of mutual interest, including in particular in training, capacity building and research in Theoretical High Energy Physics, Particle Physics, Computational Physics and Cosmology;

The mutual benefit that the Parties would derive from collaboration between them,

AGREE AS FOLLOWS:

Article 1
Purpose

This Agreement establishes the framework for collaboration between the Parties in domains of mutual interest, including in particular in training, capacity building and research in Theoretical High Energy Physics, Particle Physics, Computational Physics and Cosmology. The implementation of this Agreement by the Parties shall be subject to availability of resources at the Parties. The Parties shall use the results of their collaboration for non-military purposes only.

Article 2
Project

2.1 Each Party's contribution to a specific collaboration ("Project"), including, where applicable, the required resources, the duration of the activities and any deliverables and milestones shall be set out in an Addendum to this Agreement, which shall form an integral part of this Agreement.

2.2 Except as agreed otherwise by the Parties, each Party shall bear the cost of its participation in the collaboration and the Project(s).

Article 3
Experts

Each Party shall ensure the selection of experts with the necessary skills and competence to execute each Project on its behalf, taking into account the nature and the environment of the activities.

Article 4
Conduct and safety

4.1 The experts shall comply with the rules of conduct and safety in force at the host Party.

4.2 Any activity, equipment or other item contributed by a Party to the collaboration shall conform to the safety rules, including any specific safety requirements in force at the host Party where such activity will be performed or such equipment or other item will be installed and operated.

Agreement - 2017

Article 10
Coordination

The Parties shall each nominate a technical co-ordinator, who together shall coordinate the overall execution of this Agreement, as well as a safety correspondent who will be responsible for safety matters. Their names and contact details are set out in Annex 1. It is understood that where necessary the Parties may decide to nominate a different technical co-ordinator for each specific Project, whose name and contact details shall be set out in the relevant Addendum.

Article 11
Amendments

Any amendment to this Agreement shall be made in writing and signed by the authorized representatives of the Parties.

Signed in two copies, one for CERN and one for SEENET-MTP.

The Southeastern European Network in Mathematical and Theoretical Physics (SEENET-MTP)	The European Organization for Nuclear Research (CERN)
Goran Đorđević Executive Director	Gian Giudice Head of Theoretical Physics Department
on ...28./02..... 2017	on 06/03..... 2017

Annex 1: Co-ordinators and safety correspondents

For CERN:

Prof. Gian Giudice, Head of Theoretical Physics Department

For SEENET-MTP:

Prof. Goran Đorđević, Executive Director

CERN - SEENET-MTP PhD program

- **Seminars/Schools (2015-2018):**
  - Belgrade (Serbia), 21–27 June 2015
    "Supergravity"
  - Bucharest (Romania), 8-14 November 2015
    "Modern Aspects of Quantum Field Theory"
  - Timisoara (Romania), 11-17 December 2016
    "Computational methods in Cosmology and General Relativity"
  - Sofia (Bulgaria), 15-21 October 2017
    "New Trends in High Energy Theory"
  - Niš (Serbia), 3-9 June 2018
    "High Energy and Particle Physics: Theory and Phenomenology - BS2018"
  - **Total number of students participated in 5 Schools - 135**

CERN – SEENET-MTP PhD Program - Whishlist - 2015

Topic	Freq
Mathematical methods in quantum physics	9
Supersymmetry	9
Adv. math. subjects with application in phy.	8
General relativity	8
Particle physics	8
Quantum field theory	8
Supergravity	8
Cosmology	7
Nonlinear dynamics	7
String theory	7
Gravitation	7
Astrophysics and cosmology	5
Hadronic physics	5
Integrable systems	5
Quantum information	5
BSM phenomenology	4
High Energy Physics	4
Inflation	4
Astrophysics	2
Black hole thermodynamics	2
Condensed Matter Physics	2
Mathematical Physics	2
Neutrino Physics	2
Path integrals	2
Black holes	2

Topic	Freq
Astroparticle physics	1
Batalin-Vilkovisky formalism	1
Collider phenomenology	1
Complex Phenomena in Spatial Plasma Phy.	1
Composite Higgs	1
Computational physics	1
Conformal field theory	1
Dark matter	1
Exotic stars	1
Gauge/gravity duality	1
Higher spin theories	1
Intermitence	1
Lattice QCD	1
Nuclear Physics	1
Observational cosmology	1
QCD	1
Renormalization group in SUSY theories	1
Soft Matter Physics	1
Sterile neutrinos	1
Superstrings	1
Topological field theories	1

CERN – SEENET-MTP PhD Program

- Students (92 were registered in 2015) -

- **Belgrade**
  - Dragoljub Gočanin, Nikola Konjik, Dejan Simić, Biljana Nikolić, Dragan Prekrat, Luka Nenadović, Tijana Radenkovic
- **Bucharest**
  - Dumitriu Ana Elena, Iancu Vicentiu, Baran Virgil, Romanitan Cosmin, Giubega Lavinia Elena, Tatiana Mihaescu, Tarna Grigore, Stroe Mircea, Valcea Valentin, Eliza Teodorescu, Orlandea Marius Ciprian, Babalic Nicoleta Corina, Cristinel Stoica
- **Craiova**
  - Pauna Alina-Maria, Predatu Marian
- **Istanbul**
  - Vildan Keles Tugyanoglu, Oguzhan Kasikci, Basak Ekinci, Taygun Bulmus, Mehmet Helva, Devin Cesmecioglu, Ozlem Ozcelik
- **Kiev**
  - V. Naboka, V. Shapoval, V.Sagun, V.Chelnokov, R. Poberezhnyuk, M.Sydorenko, I. Ivanchenko, K. Ershov, O. Sobol, O. Zdorevsky, P. Gavrylenko, A. Shchechkin
- **Ljubljana**
  - Darius Faroughy
- **Niš**
  - Dragoljub Dimitrijevic, Milan Milosevic, Darko Radovancevic, Marko Dimitrijevic, Igor Petrovic, Marko Stojanovic, Danilo Delibasic
- **Sofia**
  - Zhivko Stoyanov, Yulia Mutafchieva, Kalin Marinov, Dimitar Nedanovski, Stanislav Varbev , Aleksander Stefanov, Petar Kokarchev, Tsevetan Vetsov, Stefan Mladenov, Boyan Lazov, Kalin Staykov, Lachezar Simeonov, Kaloyan Zlatanov, Dimitar Popchev
- **Thessaloniki**
  - Iosefidis, Kalamakis, Filotheodoros, Aliferis, Jaehoon, Jeong, Vasilis Kiosses
- **Timisoara**
  - Chilom Alin, Sporea Adrian Ciprian, Baloi Mihaela-Andrea, Blaga Robert Christian, Busuioc Sergiu, Roman Roxana
- **Zagreb**
  - Tamara Stemberga, Goran Popara, Petar Culjak, Anamarija Kirin, Danijel Pikutic, Boris Ivetic, Dijana Tolic, Bruno Klajn, Tajron Juric, Luka Popov, Silvije Domazet

"Pilot – 0th" Seminar Niš 2014

- The pilot seminar held at Faculty of Science, University of Niš
- *Completely financed by the SEENET-MTP Office*
- The title: **COSMO 2014**
- Date: 12 – 15 February 2014
- **Lecturers:**
  - **Neven Bilic** (IRB, Zagreb)
    Dark Matter, Dark Energy, and Unification Models
  - **Argyris Nicolaidis** (Aristotle University, Thessaloniki)
    Introduction to String Theory and its Cosmological Implications
  - **Cancelled:**
    - **Ugo Moschella** (Como)
- **Introductionary lecture:**
  - **Goran Djordjevic** (University of Nis)
    Introduction to Cosmology and Inflation
- **Tutor:**
  - **D. Dimitrijević** (University of Nis)

“Pilot – 0th” Seminar Niš 2014

- **Participants – 13**
  - Danilo Delibašić (Niš, Serbia)
  - Marko Dimitrijević (Niš, Serbia)
  - Dragoljub Dimitrijević (Niš, Serbia)
  - Nikola Filipović (Niš, Serbia)
  - Nikola Konjik (Belgrade, Serbia)
  - Milan Milošević (Niš, Serbia)
  - Aleksandar Otašević (Belgrade, Serbia)
  - Igor Prlina (Belgrade, Serbia)
  - Darko Radovančević (Zrenjanin, Serbia)
  - Ciprian Sporea (Timisoara, Romania)
  - Srđan Stavrić (Belgrade, Serbia)
  - Marko Stojanović (Niš, Serbia)
  - Stanislav Verbev (Sofia, Bulgaria)

1st Seminar - Belgrade 2015

- The first PhD seminar in the framework of the CERN-SEENET-MTP PhD Training Program.
- The seminar held at the Faculty of Physics, University of Belgrade, Serbia
- The title: **Supergravity**
- Date: 21 – 27 June 2015
- **The lectures:**
  - Leonardo Castellani (INFN Torino)
    Supergravity I
  - Hagen Triendl (CERN)
    Extended and Gauged Supergravity
  - Voja Radovanovic (University of Belgrade)
    Introduction to Supersymmetry
  - Branislav Cvetkovic (University of Belgrade)
    Poincaré gauge theory

1st Seminar - Belgrade 2015

- **Participants - 15**
  - Sergiu Busuioc (Timisoara, Romania)
  - Alin Chilom (Timisoara, Romania)
  - Dragoljub Dimitrijevic (Nis, Serbia)
  - Dragoljub Gocanin (Belgrade, Serbia)
  - Boris Ivetic (Zagreb, Croatia)
  - Oguzhan Kasikci (Istanbul, Turkey)
  - Nikola Konjik (Belgrade, Serbia)
  - Stefan Mladenov (Sofia, Bulgaria)
  - Luka Nenadovic (Belgrade, Serbia)
  - Danijel Pikutic (Zagreb, Croatia)
  - Bogdan Popovici (Bucharest, Romania)
  - Dragan Prekrat (Belgrade, Serbia)
  - Igor Prlina (Providence, RI, USA)
  - Vildan Tugyanoglu (Istanbul, Turkey)
  - Tsvetan Vetsov (Sofia, Bulgaria)

2nd Seminar - Bucharest 2015

- The second Seminar in the CERN – SEENET-MTP PhD training program
- The seminar held at the Faculty of Physics, University of Bucharest, Romania
- The title: **Modern Aspects of Quantum Field Theory**
- Date: 8 – 14 November 2015
- Lecturers:
  - **Hubert Spiesberger** (University of Mainz)
    Path integral formalism in QFT
  - **Nikolaos Tetradis** (University of Athens and CERN)
    Field theory, renormalization and cosmology
  - **Ciprian Acatrinei** (IFIN-HH, Bucharest)
    QFT in strong backgrounds
- Cancellation:
  - **Gianpiero Mangano** (INFN Napoli)
- Guest Lecturer:
  - **Goran Djordjevic** (University of Nis)
    Tachyon fields and inflation
- Tutors:
  - **Nikolaos Brouzakis** (University of Athens), **Ovidiu Cristinel Stoica** (IFIN-HH, Bucharest), **Bogdan Popovici** (IFIN-HH, Bucharest) and **Roxana Zus** (Faculty of Physics, University of Bucharest)

2nd Seminar - Bucharest 2015

- **Participants – 31**
  - Corina Nicoleta Babalic (Bucharest, Romania)
  - Virgil Baran (Bucharest, Romania)
  - Robert Blaga (Timisoara, Romania)
  - Adrian Bodnarescu (Iasi, Romania)
  - Nikolaos Brouzakis (Athens, Greece)
  - Sergiu Busuioc (Timisoara, Romania)
  - Marjan Cirkovic (Belgrade, Serbia)
  - Andreea Mihaela Croitoru (Bucharest, Romania)
  - Petar Culjak (Zagreb, Croatia)
  - Dragoljub Dimitrijevic (Nis, Serbia)
  - Radu Dragomir (Bucharest, Romania)
  - Diana Dragomirescu (Bucharest, Romania)
  - Vitalii Drohan (Kiev, Ukraine)
  - Basak Ekinici (Istanbul, Turkey)
  - Dragoljub Gocanin (Belgrade, Serbia)
  - Dana Ioan (Bucharest, Romania)
  - Cristian Ivan (Bucharest, Romania)
  - Boris Ivetic (Zagreb, Croatia)
  - Oguzhan Kasikci (Istanbul, Turkey)
  - Nikola Konjik(Belgrade, Serbia)
  - Boian Lazov (Sofia, Bulgaria)
  - Mihai Marciu (Bucharest, Romania)
  - Denisa Andreea Mihu (Iasi, Romania)
  - Stefan Mladenov (Sofia, Bulgaria)
  - Danijel Pikutic (Zagreb, Croatia)
  - Ovidiu Cristinel Stoica (Bucharest, Romania)
  - Marko Stojanovic (Nis, Serbia)
  - Alina Maria Streche (Craiova, Romania)
  - Maksym Sydorenko (Kiev, Ukraine)
  - Vildan Tugyanoglu (Istanbul, Turkey)
  - Valentin Valcea (Bucharest, Romania)

3rd Seminar - Timisoara 2016

- The seminar held at the West University of Timisoara, Romania
- The title: **Computational methods in Cosmology and General Relativity**
- Date: 11 – 17 December 2016
- Lecturers:
  - **Ignatios Antoniadis** (IAE Bern/ LPTHE-CNRS-UPMC, Paris)
    An introduction to supersymmetry and supergravity
  - **Neven Bilić (**Rudjer Bošković Institute, Zagreb)
    Hamiltonian method and its application to braneworld cosmology
  - **Eugen Cioroianu** (University of Craiova)
    Dirac analysis of spin-2 fields. Pauli-Fierz and Hilbert-Einstein formulations
  - **Ion Cotăescu** (West University of Timișoara)
    Dirac equation and aplication under algebraic computing
- Guest lecturers:
  - **Paul Grăvilă** (CERN – ATLAS/IFIN Bucharest)
    Offline computing at CERN
  - **Glen Wheeler** (University of Wollongong, Australia)
    Curvature flow and Bray's proof of the Penrose inequality
  - **Valentina Wheeler** (University of Wollongong, Australia)
    Introduction to mean curvature flow – theory and applications
- Tutor:
  - **Ciprian Sporea** (West University of Timișoara)

3rd Seminar - Timisoara 2016

- **Participants – 23**

- Mihaela-Andreea Baloi (Timisoara, Romania)
- Robert Blaga (Timisoara, Romania)
- Nilay Bostan (Istanbul, Turkey)
- Florina Branzei (Timisoara, Romania)
- Sergiu Busuioc (Timisoara, Romania)
- Alin Chilom (Timisoara, Romania)
- Danilo Delibasic (Nis, Serbia)
- Dragoljub Gočanin (Belgrade, Serbia)
- Ömer Güleryüz (Istanbul, Turkey)
- Ivo Iliev (Sofia, Bulgaria)
- Dana Maria Ioan (Bucharest, Romania)
- Nikola Konjik (Belgrade, Serbia)
- Denisa-Andreea Mihu (Iasi, Romania)
- Milan Milosevic (Nis, Serbia)
- Ana Pancheva (Sofia, Bulgaria)
- Gabriel Pascu (Timisoara, Romania)
- Diana Popescu (Timisoara, Romania)
- Miroslav Radomirov (Sofia, Bulgaria)
- Ciprian Sporea (Timisoara, Romania)
- Marko Stojanovic (Nis, Serbia)
- Alina Maria Streche (Craiova, Romania)
- Vasil Todorinov (Sofia, Bulgaria)
- Valentin Stefan Valcea (Bucharest, Romania)

4th Seminar - Sofia 2017

- The seminar held at the Faculty of Physics, University of Sofia, Bulgaria.
- The title: **New Trends in High Energy Theory**
- Date: 16 – 20 October 2017
- Lecturers:
  - **Timo Weigand** (CERN, Geneva, Switzerland)
  - **Atish Dabholkar** (ICTP, Trieste, Italy)
  - **Anastasios Petkou** (AU, Thessaloniki, Greece)
  - **Veselin Filev** (DIAS, Dublin, Ireland)
  - **Nikolay Bobev** (KU Leuven, Belgium)
  - **Kiril Hristov** (INRNE, BAS, Bulgaria)

  Summary lecture:
  - **Radoslav Rashkov** (Sofia University, Bulgaria)

4th Seminar - Sofia 2017

- **Participants – 26**

- Aleksander Stefanov (Sofia, Bulgaria)
- Busuioc Sergiu (Timisoara, Romania)
- Danilo Delibasic (Nis, Serbia)
- Dejan Simic (Belgrade, Serbia)
- Dragoljub Dimitrijevic (Nis, Serbia)
- Dragoljub Gocanin (Belgrade, Serbia)
- Florian Aurelia Daniela (Craiova, Romania)
- Jesse van Muiden (Leuven, Belgium)
- Ioan-Mihail Dinu (Bucharest, Romania)
- Ivo Iliev (Sofia, Bulgaria)
- Kalin Kolev (Sofia, Bulgaria)
- Kalin Staykov (Sofia, Bulgaria)
- Marko Stojanovic (Nis, Serbia)
- Mehmet Helva (Istanbul, Turkey)
- Milan Milosevic (Nis, Serbia)
- Miroslav Radomirov (Sofia, Bulgaria)
- Nilay Bostan (Istanbul, Turkey)
- Oleh Savchenko (Kyiv, Ukraine)
- Pauna Alina-Maria (Craiova, Romania)
- Pieter Bomans (Leuven, Belgium)
- Radoslav Simeonov (Sofia, Romania)
- Stanislav Varbev (Sofia, Bulgaria)
- Tereza Vakhtel (Kyiv, Ukraine)
- Tijana Radenkovic (Belgrade, Serbia)
- Vasil Todorinov (Sofia, Bulgaria)
- Vincent Min (Leuven, Belgium)

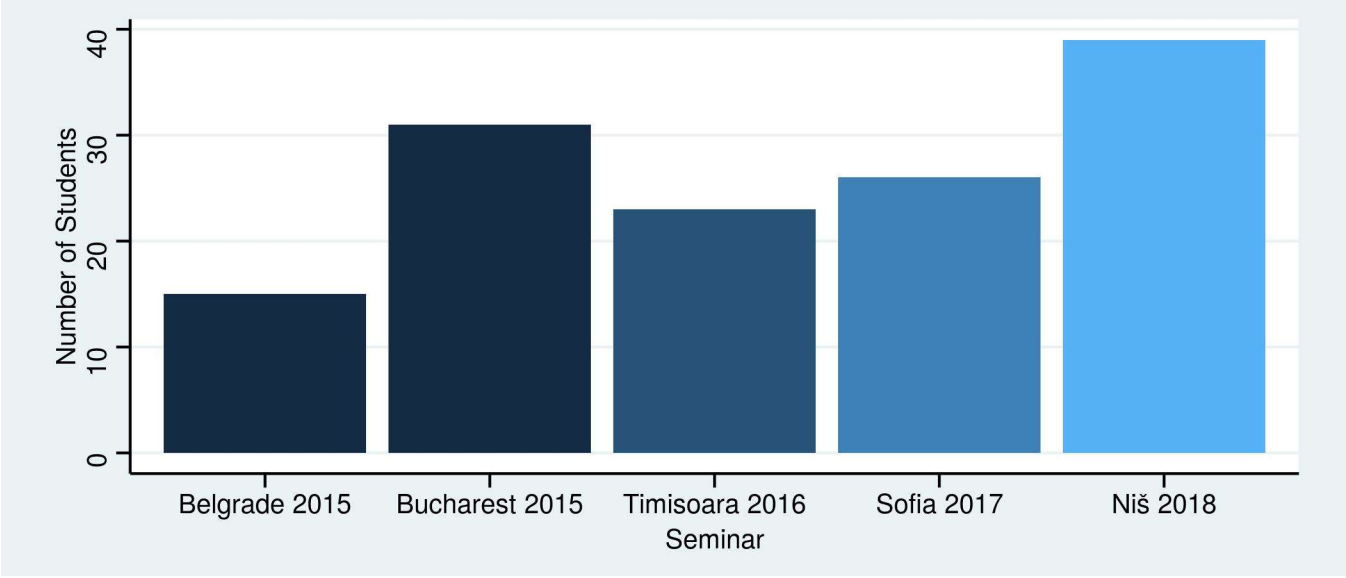
5th Seminar - Niš 2018

- The seminar held at the Faculty of Sciences and Mathematics, University of Niš, Serbia.
- The title: **High Energy and Particle Physics: Theory and Phenomenology**
- Date: 3 – 10 June 2018
- Lecturers:
  - **Ignatios Antoniadis** (Albert Einstein Center for Fundamental Physics, Bern)
    String Phenomenology
  - **Lasha Berezhiani** (LMU-MPI, Munich)
    Introduction to Supersymmetry
  - **Paolo Creminelli** (ICTP, Trieste)
    Cosmology and Inflation
  - **Emilian Dudas** (CPHT, Paris)
    Standard Model / String Phenomenology
  - **Kyriakos Papadodimas** (CERN, Geneva)
    AdS/CFT correspondence and Black Holes
  - **Sergey Sibiryakov** (CERN, Geneva)
    Introduction into Cosmic Structure Formation
  - Cancellation:
    - **Giovanni Villadoro** (ICTP, Trieste)
      Standard Model
- Guest Lecturer
  - **Alexei Starobinsky** (Landau Institute, Moscow)
    Inflation: the present status

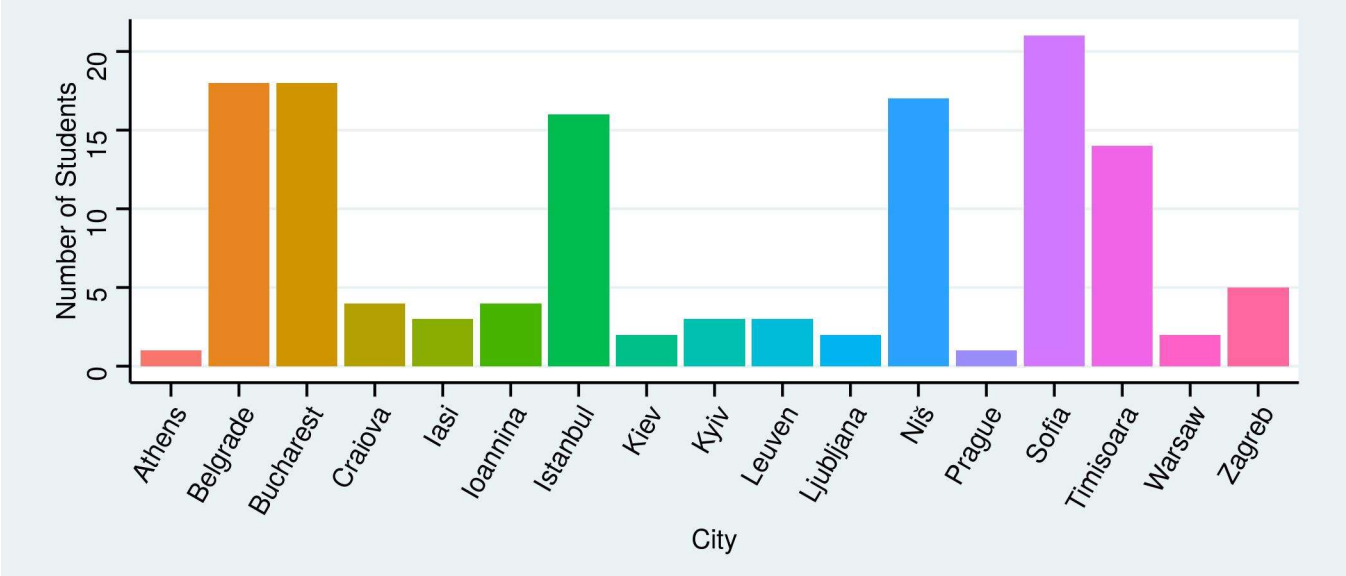
5th Seminar - Niš 2018

- **Participants - 40**
  - Zehra Abdrahim (Sofia, Bulgaria)
  - Nikola Andrejić (Niš, Serbia)
  - Nilay Bostan (Istanbul, Turkey)
  - Taygun Bulmus (Istanbul, Turkey)
  - Sergiu Busuioc (Timisoara, Romania)
  - Sercan Çıkıntoğlu (Istanbul, Turkey)
  - Victor Danchev (Sofia, Bulgaria)
  - Danilo Delibašić (Nis, Serbia)
  - Aleksandra Dimić (Belgrade, Serbia)
  - Marko Dimitrijević (Niš, Serbia)
  - Stefan Djordjevic (Niš, Serbia)
  - Zofia Fabisiewicz (Warsaw, Poland)
  - Dragoljub Gočanin (Belgrade, Serbia)
  - Simona Grigorova (Sofia, Bulgaria)
  - Victor Guada (Ljubljana, Slovenia)
  - Mehmet Helva (Istanbul, Turkey)
  - Florin Vlad Iancu (Bucharest, Romania)
  - Ivo Iliev (Sofia, Bulgaria)
  - Dana Ioan (Bucharest, Romania)
  - Pavel Jiroušek (Prague, Czech Republic)
  - Oguzhan Kasikci (Istanbul, Turkey)
  - Nikola Konjik (Belgrade, Serbia)
  - Marko Krstic (Niš, Serbia)
  - Angelos Lykkas (Ioannina, Greece)
  - Sebastian Micluța-Câmpeanu (Bucharest, Romania)
  - Milan Milošević (Niš, Serbia)
  - Tijana Radenković (Belgrade, Serbia)
  - Andrei Ioan Radoacă-Dogaru (Bucharest, Romania)
  - Miroslav Radomirov (Sofia, Bulgaria)
  - Maria Różańska-Kamińska (Warsaw, Poland)
  - Dejan Simic (Belgrade, Serbia)
  - Vladyslava Sharkovska (Kyiv, Ukraine)
  - Aleks Smolkovič (Ljubljana, Slovenia)
  - Marko Stojanovic (Nis, Serbia)
  - Ilias Tavellaris (Ioannina, Greece)
  - Lampros Trifyllis (Ioannina, Greece)
  - Vildan Tuğyanoğlu (Istanbul, Turkey)
  - Konstantinos Violaris-Gkountonis (Ioannina, Greece)
  - Utku Zorba (Istanbul, Turkey

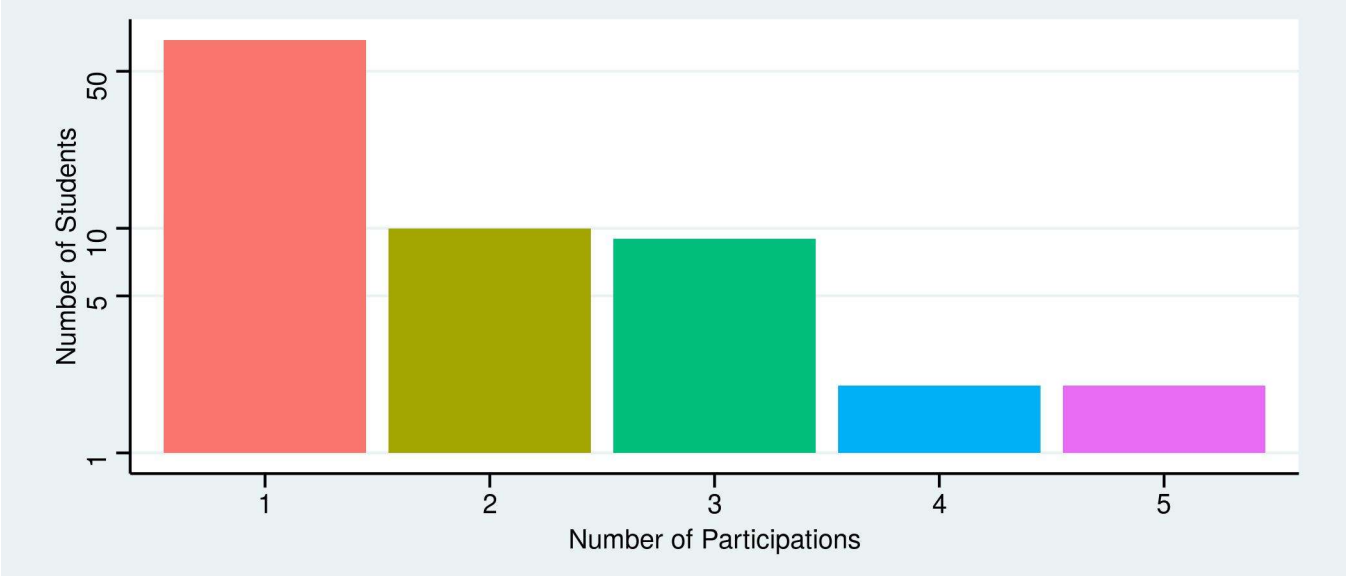
Number of participants in the particular Seminar/School



Number of participation from the Network`s or partners` nodes



``Frequency`` of participation in the events



II CERN – SEENET-MTP PhD Program (2019-2022)

- SEENET-MTP Scientific-Advisory Committee (June 10, 2018) and SEENET-MTP Council (June 14, 2018) proposed to continue the program in the new cycle 2019-2022
- There are two proposals for hosting the next schools
- 1. Ioannina, Greece – late spring 2019
- 2. Craiova, Romania - spring 2020

- Open questions and problems ...