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PREFACE

The series of Balkan Workshops in Theoretical and Mathematical Physics was started by the first Balkan Workshop BW2003 – Mathematical, Theoretical and Phenomenological Challenges Beyond the Standard Model: Perspectives of Balkan's Collaboration, held in Vrnjačka Banja in 2003. It marked the birth of what was to become a widely recognizable regional network in Theoretical and Mathematical Physics – the South-eastern European Network in Theoretical and Mathematical Physics, the SEENET-MTP Network.

The Network has 22 nodes, 13 partner institutions, and more than 450 individual members. During the 2018 year the Network, its Nodes and Office have marked this modest Jubilee – 15 Years of the SEENET-MTP. Its 15th birthday offered a welcome opportunity to celebrate successful regional and interregional scientific and educational collaboration, as well as to gather the leading scientists engaged in forefront research in the fields of Theoretical and Mathematical Physics.

Such was the objective of the Fifth School in the joint CERN – SEENET-MTP PhD Training Program, entitled *Balkan School BS2018 – High Energy and Particle Physics: Theory and Phenomenology*, which took place in Niš (3 - 10 June 2018).

The BS2018 School marked the completion of the first cycle of the CERN – SEENET-MTP Program for PhD students and young scientists. This final School of the first cycle of the Program was devoted primarily to PhD students in the fields of Cosmology and High Energy Physics. A total of 40 participants from 10 countries attended the School.

The lectures were held by Ignatios Antoniadis (*String Phenomenology*), Lasha Berezhiani (*Introduction to Supersymmetry*), Paolo Creminelli (*Cosmology and Inflation*), Emilian Dudas (*Standard Model and String Phenomenology*), Kyriakos Papadodimas (*AdS/CFT correspondence and Black Holes*) and Sergey Sibiryakov (*Introduction into Cosmic Structure Formation*). A guest lecture was held by Alexei Starobinsky (*Inflation: The Present Status*).

The School was followed by the *SEENET-MTP Balkan Workshop BW2018 – Field Theory and the Early Universe* (10 – 14 June 2018). A total of 50 participants attended the BW2018. The scientific part of the Workshop included recent developments in Beyond the Standard Cosmological Model(s) and related fields. The BW2018 presented an excellent opportunity to gather the leading experts from South-East, Central, and Eastern Europe, EU, USA, to discuss open problems and perspectives in the main scientific areas of the Workshop. Besides the scientific part of the BW2018, the workshop was an opportunity for a series of round tables and meetings related to the promoting and strengthening research, education, and capacity-building in physics and natural sciences in particular in South-Eastern Europe.

Both events, the School BS2018, and the Workshop BW2018, were excellent opportunities for scientists and young researchers to discuss the present status of various research subareas of theoretical and mathematical physics.

A good part of numerous talks and discussions that took place during the events offered a solid ground for this publication. This is precisely what this present volume of the *Facta Universitatis, Series Physics, Chemistry and Technology series* is aiming at.

The accepted papers, covering a range of topics, are mostly the results of collaborations between colleagues from two network nodes: cosmology, gravity, noncommutativity, black holes, extra dimensions, effective field theories, etc.

All papers have been peer-reviewed. We express our gratitude to all authors for their contributions and to all referees whose suggestions have improved the quality of the scientific contents. Kind cooperation with Prof. Niko Radulović, Editor-in-Chief, is also kindly acknowledged.

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- The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy,
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- Serbian Ministry of Education, Science and Technological Development and
- Faculty of Sciences and Mathematics, University of Niš, Serbia.

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