35th International Symposium on Lattice Field Theory
18–24 June 2017, Granada, Spain

http://www.lattice2017.es

Lattice2017

Preface

These are the proceedings of the 35th edition of the annually held *International Symposium on Lattice Field Theory*, Lattice 2017. This year's Symposium was jointly organised by the Spanish Lattice Field Theory community and took place at the Exhibition and Conference Centre in Granada, Spain, 18–24 June 2017.

The annual Lattice Symposia [1–35] are an important platform for a worldwide community of researchers working on nonperturbative studies of a variety of quantum field theories. Traditionally, the main focus is on solving the theory of strong interactions, Quantum Chromodynamics (QCD). In order to do so, Lattice field theory researchers work at the interface of theoretical high energy physics and high performance computing. Due to the many advances in both areas over the last decade(s), we have arrived at a point at which physical effects of Quantum Electrodynamics (QED) become increasingly important, and during the last few years a lively discussion takes place on how to best achieve its inclusion into various physical processes. In accordance with ever increasing experimental sophistication and precision, the ultimate goal certainly is to simulate the world of elementary particles as we know it, the standard model of particle physics (SM), and by comparison to verify its predictions or quantify its limitations. After more than 30 years of steady progress we still have a long way to go.

In compliance with the international advisory committee (IAC), the local organising committee (LOC) has tried to put together a balanced plenary program (28 presentations) with a diversified list of speakers that showcases the most promising results and ideas since the previous edition, as well as important progress within the community [36–63]. The parallel sessions have been grouped into the following tracks:

- Algorithms and Machines (20)
- Applications Beyond QCD (14)
- Chiral Symmetry (11)
- Hadron Spectroscopy and Interactions (41)
- Hadron Structure (52)
- Nonzero Temperature and Density (63)
- Physics Beyond the Standard Model (35)
- Software Development (21)
- Standard Model Parameters and Renormalization (12)

Figure 1. Lattice 2017 group photo.

- Theoretical Developments (34)
- Vacuum Structure and Confinement (12)
- Weak Decays and Matrix Elements (38)

summing up to a total of 353 parallel contributions. With additional 36 poster presentations the total number of contributions is 417 out of 453 conference participants. Figure 1 shows the group photo of Lattice 2017 attendees.

This is the first time that the Symposium has taken place in Spain and the second time that two consecutive editions have been hosted on the same continent. In the name of the LOC—V. Azcoiti, I. Campos, M. Della Morte, E. Follana, P. Fritzsch, M. García Pérez, G. Herdoíza, P. Hernández, F. Mescia, A. Parreño, C. Pena Ruano, A. Ramos, J. Rodríguez-Quintero, chaired by E. Gámiz Sánchez and A. González-Arroyo (co-chair)—we would like to thank all attendees of Lattice 2017 for the pleasant atmosphere and interesting scientific discussions in the heat of Granada.

The Editors

Michele Della Morte
Patrick Fritzsch (chair)
Elvira Gámiz Sánchez
Carlos Pena Ruano

The 35th International Symposium on Lattice Field Theory

Lattice 2017 has gathered 453 conference participants that have contributed to a fruitful scientific program. Plenary talks have combined a large number of topical talks, trying to put the emphasis on open problems and new results, with a series of reviews, including the present status of Kaon physics [42], lattice approaches to beyond the standard model physics [54], nucleon bound states [60, 61], quantum simulations [38], and the sign problem [57]. Talks dedicated to specific topics ranged from the discussion of B-physics anomalies in the flavour sector [40, 41] or the determination of α_s from different perspectives [55, 56], to the status and evolution of QCD codes for high-performance computing [59], this year with special emphasis on the new KNL architecture (Intel) that will play an important role in the next generation of supercomputers. Progress in the calculation of notoriously difficult quantities like the nucleon axial charge [45], the nucleon EDM [51], the muon anomalous magnetic moment [62, 63], or the gluonic structure of nuclei [52] has also been reported. Another topic that has drawn a lot of attention recently is the computation of quasi-parton distribution functions; a plenary session trying to assess the impact of lattice results in this field has been presented during the conference [43]. In this edition, the search for algorithmic improvements and new computational strategies has encompassed new ways to tame the effects of the signal-to-noise problem [39, 44] or the sign problem [58], as well as simulation strategies to use very large volumes as a way to effectively increase statistics [37]. In addition, and after a number of editions that did not display such events, a plenary discussion forum has been included in this year's program, focussing on recent advances and status of axions and the chiral anomaly at finite temperature [46–50]. We would like to thank the members of International Advisory Committee for their help in organising a diversified scientific program. Our thanks also go to session chairs and to all the presenters and participants for making a successful conference possible.

Scientific and personal recollections of Roberto Petronzio

The first plenary contribution was honoring the life and work of Roberto Petronzio (1949-2016). Roberto was a major contributor to the development of QCD, pioneered the field of non-perturbative Lattice QCD simulations, and gave fundamental contributions to the field and our community. The talk was given by a long time collaborator and close friend, Giorgio Parisi [36].

Kenneth G. Wilson Award

The *Kenneth G. Wilson Award for Excellence in Lattice Field Theory* was established in 2011 to recognize outstanding contributions in lattice field theory. The prize is given annually and includes an invitation to present the cited work in a short plenary talk at the International Symposium on Lattice Field Theory. The award rules have changed with time; in its current form, it recognizes outstanding physicists who are within seven years of completing their Ph.D. at the time of nomination, plus any career breaks. The research recognized could either be a single piece of work or the sum of several contributions.

In 2017, the Selection Committee—consisting of Shoji Hashimoto (chair), Christine Davies (vice-chair), Stefan Meinel (2015 recipient), Silas Beane, and Stefan Sint—granted the Kenneth G. Wilson Award to [53]

Raúl A. Briceño (Jefferson Lab)

For groundbreaking contributions to the study of resonances using lattice QCD

Women in Lattice

The Women in Lattice (WIL) activities consisted of a meeting that all female registrants were invited to join, and a competition during the poster session. At the lunch meeting, participants discussed several topics introduced by discussion leaders, including female participation as plenary speakers at main conferences on the field, studies of gender bias on teaching evaluation and letters of recommendation, or what specific steps both women and men could take to improve the equity. At the end of the meeting, participants took a brief survey on the type of WIL meeting they preferred and what topics and/or activities they were interested in pursuing.

WIL also sponsored a contest during the poster session, which attracted a lot of interest. A poster picturing five female physicists and computer scientists each was displayed during both poster sessions. Conference participants were encouraged to guess the names of the women from a word bank at the bottom of the poster, where additional names were included as a distraction. The quiz contest surprisingly showed that female computer scientists are better known than female physicists. The knowledge about the female physicists was pretty poor, with 61% of quiz participants getting only one or none right answers.

The International Advisory Committee meeting

During the IAC meeting, the participants receive presentations from potential candidate hosts for the next-to-next Symposium on Lattice Field Theory. This year it has been decided that Lattice 2019 will be hosted in *Wuhan, China* and be jointly organized by the Chinese Lattice Field Theory community. For the time being we are looking forward to the next Lattice conference, Lattice 2018 [64],

36th International Symposium on Lattice Field Theory,
22-28 Jul 2018. East Lansing, MI, United States.

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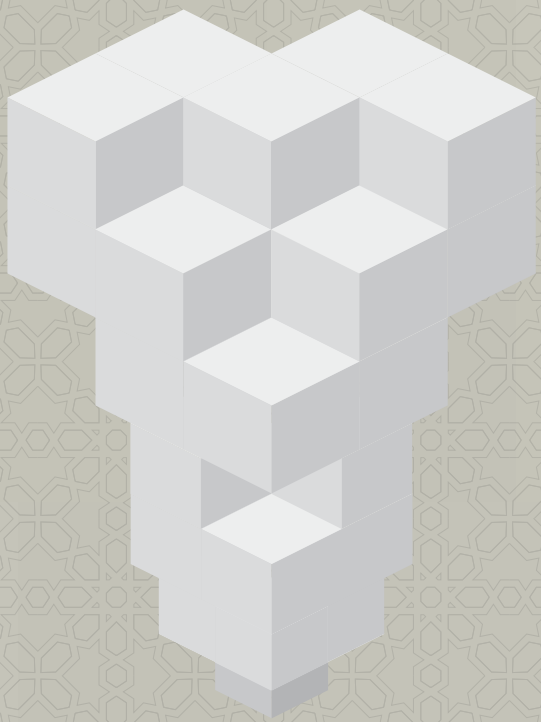

18 - 24 JUNE 2017

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CONFERENCE TOPICS

Algorithms & Machines
Applications Beyond QCD
Chiral Symmetry
Hadron Spectroscopy & Interactions
Hadron Structure
Nonzero Temperature & Density
Physics Beyond the Standard Model
SM Parameters & Renormalization
Theoretical Developments
Vacuum Structure & Confinement
Weak Decays & Matrix Elements

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