

# PREFACE

A large amount of theoretical and experimental research is devoted to the study of the strongly interacting matter as expected in the early universe and in the interior of compact stars. Today, matter existing under such extreme conditions is produced in relativistic heavy-ion experiments running at the Large Hadron Collider (LHC) and the Super Proton Synchrotron (SPS) at CERN, as well as the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory. The central goal is to decipher the interplay of the deconfinement of color and the restoration of chiral symmetry at high temperature and density, as well as to deduce their influence on the phase structure of strongly interacting matter.

The framework for the theoretical analysis of the strongly interacting matter is the Quantum Chromo Dynamics (QCD). There is also a well-established and powerful calculational tool, based on large-scale numerical calculations in the framework of lattice regularized QCD, for studying properties of this matter. It is by far not easy, however, to compare directly such first principle calculations with data obtained in heavy-ion collision experiments. It thus is quite common in this field of research to utilize effective model calculations, *e.g.*, performed in the framework of hadron resonance gas, which can provide an interface between experimental data and the fundamental theory of strong interactions.

The three-day workshop *Criticality in QCD and the Hadron Resonance Gas*, held as an online meeting at the University of Wrocław during July 29–31, 2020, was devoted to the presentation and discussion of progress made in understanding the phase diagram of strongly interacting matter through experimental studies at the LHC and RHIC, effective model calculations, and numerical studies of the phase diagram in lattice QCD calculations. During a difficult period where the impossibility of face-to-face meetings hampered the direct exchange of ideas, it provided a forum, which was particularly useful to keep young scientists in touch with this rapidly developing field of research.

The timetable with links to the slides of all talks can be found on the website of the workshop

<https://events.ift.uni.wroc.pl/event/67/timetable/#all>

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