Springer Proceedings in Physics

Volume 170

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1st Karl Schwarzschild Meeting on Gravitational Physics

Springer

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ISSN 0930-8989 ISSN 1867-4941 (electronic)
Springer Proceedings in Physics
ISBN 978-3-319-20045-3 ISBN 978-3-319-20046-0 (eBook)
DOI 10.1007/978-3-319-20046-0

Library of Congress Control Number: 2015945121

Springer Cham Heidelberg New York Dordrecht London

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

Preface

The 2013 Karl Schwarzschild Meeting on Gravitational Physics (KSM) was a top international event involving the worldwide highest qualified scientific personalities in the field of black hole physics, general relativity, and related topics. It featured the participation of 91 scientists from 15 countries over 4 continents. These attendees included undergraduate and graduate students, postdoctoral researchers, as well as junior and senior faculty. We envisioned the foundational spirit of the conference to be: "by acknowledging the past we open a route to the future." Here "the past" refers to the pioneering black hole studies of Karl Schwarzschild, a native of Frankfurt am Main, who published his first two papers while attending the Frankfurt-Gymnasium (now the Lessing-Gymnasium) in Fürstenbergerstraβe 166 in the late 1880s.

The year 2013 marked the 140th anniversary of Schwarzschild's birth. Although inspired by the key historical work of Karl Schwarzschild, this meeting served to highlight its various repercussions in a variety of aspects of frontier theoretical physics. Black holes are no longer pedagogical curiosities of mathematics physics. Instead, these objects constitute one of the primary testbeds of the ultimate theory of nature: quantum gravity. Their presence in many distinct branches of physics is striking. Historically, this is the result of a long process started with the discovery of the Hawking effect (also known as black hole evaporation), which can be regarded as the first attempt to reconcile gravity and quantum mechanics. The Hawking effect has since contributed to the collapse of barriers between gravitation and particle physics, thermodynamics, and even condensed matter physics.

Over the past decade, black holes have become a central feature of attempts to address the hierarchy problem through the introduction of extra spatial dimensions. In such frameworks, it has become commonplace in high energy physics to suppose that microscopic black holes could be produced in current and future accelerator experiments. Black holes have also gained a more solid reception in the field of observational astronomy due to the improved technology of modern radio-telescopes and are a common topic to astronomers and theoretical particle physicists. In contrast to the various international meetings on gravitation, the KSM sought to offer a complementary program: rather than quantity, we aimed for quality.

A smaller group of eminent scientists came to review groundbreaking frontier results in gravity research by means of comprehensive plenary lectures.

As a completely new feature, we provided a worldwide platform specifically dedicated to young scientists. To foster the synergy and the collaborative spirit among senior academics and forthcoming scientific leaders, a major component of the KSM featured plenary sessions highlighting the work of the "next generation" of gravitational physicists. This included a variety of levels of researchers: young research group leaders, assistant professors, postdoctoral researchers, and even doctoral candidates. Selected senior scientists served as mentors to the group of young participants, starting off the week with a "Meet Your Mentor" session to discuss their research and career paths. A competition for "Best Student Talk" and "Best Junior Scientist Talk" was sponsored by Springer. The winners were honored at an evening gala onward the end of the week. The prize for Best Student Talk was won by Daniel Siegel (MPI, Potsdam), with Honorable Mentions going to Maximiliano Isi (Loyola Marymount University, Los Angeles), Stefan Janiszewski (University of Washington, Seattle), and Benjamin Niedner (Oxon). The prize for Best Junior Scientist Talk was awarded to Daniele Malafarina (Fudan University, Shanghai), with Honorable Mentions to Shohreh Abdolrahimi (Oldenburg University), Michele Fontanini (Sao Paolo University), Benjamin Koch (PUC, Santiago).

In a time of online-journals and electronic communication, the KSM was envisioned as not merely a venue for exchange of information, but rather as a place where new ideas are developed through complementary knowledge and encouraged interactions of the participants. We feel the conference more than met these goals. In this volume, we share the fruits of this labor.

Frankfurt am Main

Piero Nicolini
Matthias Kaminski
Jonas Mureika
Marcus Bleicher

The participants and organizers of the Karl Schwarzschild Meeting 2013 in the FIAS Lecture Hall


DFG
HIC for FAIR
Helmholtz International Center
FREUNDE DER UNIVERSITÄT
Springer
FIAS Frankfurt Institute for Advanced Studies
Keynote Speakers:
Alfio Bonanno (Catania Observatory)
Silke Britzen (MPI Bonn)
Xavier Calmet (Sussex)
Bernard Carr (QMU London)
Georgi Dvali (LMU / MPI Munich / NYU)
Steven Gubser (Princeton)
Andreas Karch (UW Seattle)
Frans Klinkhamer (KIT)
Claus Laemmerzahl (Bremen / ZARM)
Greg Landsberg (Brown / CERN)
Frank Linhard (Frankfurt)
Reinhard Meinel (Jena)
Robert Mann (Waterloo / PI)
John Moffat (Waterloo / PI)
Leonardo Modesto (Fudan)
Thanu Padmanabhan (IUCAA)
Luciano Rezzolla (MPI Potsdam)
Kellog Stelle (Imperial)
Leonard Susskind (Stanford)
Herman Verlinde (Princeton)
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Clifford Will (Florida / WUSTL)
Karl Schwarzschild Meeting 2013
Frankfurt am Main
22-26 July 2013
Organizers:
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Marcus Bleicher (FIAS)
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KSM 2013

Acknowledgments

The organizers of the 2013 Karl Schwarzschild Meeting on Gravitational Physics are grateful for the generosity of the Frankfurt Institute for Advanced Studies for providing the spectacular venue at which the meeting took place. We thank the Deutsche Forschungsgemeinschaft (DFG), the Helmholtz International Center for FAIR, and the Freunde und Förderer der Goethe-Universität Frankfurt for their financial support, as well as the Physikalischer Verein Frankfurt for hosting a visit to the old Physics Institute where the Stern-Gerlach Experiment was performed in 1922. Special thanks goes to Springer for providing the prizes for Best Student and Best Junior Scientist presentations, the basis for an integral part of our philosophy.

For their help and support of our efforts, we extend a special acknowledgment to our Advisory Board: Jacob Bekenstein (Hebrew University of Jerusalem), Ted Jacobson (University of Maryland, College Park), Joseph Polchinski (University of California and Kavli Institute for Theoretical Physics, Santa Barbara), Martin Reuter (Johannes-Gutenberg University, Mainz), Carlo Rovelli (Aix-Marseille University and Centre de Physique Théorique, Marseille), and Dam T. Son (The University of Chicago).

Finally, we are indebted to all participants who helped to make the KSM a success, and hopefully the first of many such meetings to come.

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