

29<sup>th</sup> Annual Conference of Doctoral Students

# WDS'20

“WEEK OF DOCTORAL STUDENTS 2020”

FACULTY OF MATHEMATICS AND PHYSICS  
CHARLES UNIVERSITY  
CZECH REPUBLIC



September 22, 2020  
to  
September 24, 2020

## Physics

*J. Šafránková and J. Pavlů (editors)*

© J. Šafránková and J. Pavlů (editors), 2020  
© MATFYZPRESS, vydavatelství Matematicko-fyzikální fakulty  
Univerzity Karlovy, 2020

ISBN 978-80-7378-435-5

## Contents

<b>Preface</b> .....	5
<b>T. Ďurovcová, J. Šafránková, and Z. Němeček, Connection Between Proton Beam and Alpha Core in the Solar Wind, f2</b> .....	7
<b>A. Salohub, J. Šafránková, Z. Němeček, G. Pi, and F. Němec, Two-point Observations of ULF Fluctuations in the Foreshock, f2</b> .....	14
<b>S. Gohl and F. Němec, A New Method for Separation of Electrons and Protons in a Space Radiation Field Developed for a Timepix3 Based Radiation Monitor, f2</b> .....	21
<b>T. Výboštková, Z. Němeček, and J. Šafránková, Magnetospheric Response to Solar Wind Driving, f1</b> .....	28
<b>R. Eappen and P. Kroupa, Elliptical Galaxies in MOND, f1</b> .....	38
<b>J. Merc, R. Gális, and M. Wolf, Spectroscopic Analysis of Selected Symbiotic Candidates, f1</b> .....	45
<b>V. Skoupý and G. Lukes-Gerakopoulos, Gravitational Wave Templates from Extreme Mass Ratio Inspirals, f1</b> .....	52
<b>M. Štolc, V. Karas, P. Suková, V. Witzany, and M. Zajaček, A Gappy Accretion Disc: Theoretical Profiles of a Relativistic Spectral Line, f1</b> .....	59
<b>F. Hložek, Review on Telescope Motivated Education, f12</b> .....	65
<b>T. Tměj, Linearity of Light Yield in JUNO Neutrino Experiment, f9</b> .....	69
<b>O. Bezshyyko, L. Golinka-Bezshyyko, I. Kadenko, A. Kotenko, V. Lysenko, T. Povar, S. Olejnik, O. Vodin, V. Kushnir, V. Mitrochenko, and S. Perezhugin, Isomer Ratios of Products of Photonuclear Reactions on <sup>107</sup>Ag, f9</b> .....	76
<b>L. Kripner, M. Peterka, T. Markovič, M. Becoulet, G. Huysmans, M. Komm, F. Jaulmes, J. Adánek, D. Tskhakaya, R. Pánek, M. Hoelzl, and JOREK team, JOREK Simulation of Strike Point Splitting Induced by HFS Magnetic Perturbation, f2</b> ...	82
<b>E. Matveeva, J. Havlíček, R. Dejarnac, M. Jeřáb, D. Šesták, J. Adamek, J. Cavalier, V. Weinzettl, A. Havránek, the COMPASS team, F.J. Artola, M. Lehnen, R. Pitts, and R. Roccella, Current Flows Towards the Divertor During VDEs at COMPASS, f2</b> .....	88
<b>L. Uvarova, D. Shapko, M. Kassayová, P. Dohnal, R. Plašil, Š. Roučka, J. Glosík, Time Resolved Electron Number Density Measurements in Low Temperature Afterglow Plasma, f2</b> .....	94
<b>A. Kapran, Z. Hubička, M. Čada, M. Tichý, Diagnostics of Surfatron-generated Plasma in PE-ALD Deposition System, f2</b> .....	100
<b>J. Palacký and Š. Roučka, Dynamic Study of Fast Measurement with Langmuir Probe, f2</b> .....	106
<b>A. Tuholukov and V. Stelmashuk, Comparison of Underwater Spark Simulation Using Elliptical and Cylindrical Models, f2</b> .....	111
<b>H. Libenská, J. Hanuš, A. M. Ahadi, P. Kudrna, O. Kylián, V. Červenková, M. Cieslar, T. Košutová, and H. Biederman, Core@shell Ag@Ti Nanoparticles Prepared by In-flight Coating, f4</b> .....	118

**N. Khomiakova**, Z. Krtouš, P. Solař, and O. Kylián,  
Gold/Fluorocarbon Nanocomposites for Enhanced Solar-driven Water Evaporation, **f4** . . . . 123

**Š. Midlik**, D. Schmoranzer, and L. Skrbek, Generation and Detection of Quantum  
Turbulence in He II by Second Sound, **f3** . . . . . 131

## PREFACE

Due to the COVID-19 pandemic, the **29<sup>th</sup> Annual Conference of Doctoral Students** was postponed and was held in Prague, at Charles University, Faculty of Mathematics and Physics from September 22 to September 24, 2020 as a virtual meeting. The traditional WDS Proceedings in your hands that is limited to physical studies is compiled from 20 student manuscripts finally accepted for publication in this hard year.

All submitted manuscripts were reviewed by two referees because we believe that it helps students to learn how to prepare the written presentation of their results in a foreign language and how to respond the referee's notices. They should take into account their comments and prepare a new submission including letters to referees where they explain their reaction. This is a standard publication procedure in scientific journals and we are offering an exercise that would be useful for students in future. Moreover, one of referees is a doctoral student, thus he/she can practise in the preparation of a review. Moreover, the subject of the paper under review is often slightly different from his/her field of research, so the student's referees should investigate a new problem and another style of writing. They can see that a good and comprehensive review is sometimes a very difficult task. Therefore, a level of student's reports is often different — from a formal review only to precise reports with a number of comments and suggestions.

The second referee is selected from the experienced senior researchers and, in this year, their list includes over 40 % of foreign experts, because they feel the importance of such a method of teaching. We would like to express many thanks to all 50 referees for the understanding and great help. Their effort significantly contributed to a traditionally good quality of the Proceedings and you can find over 750 citations to articles in previous volumes in Web of Science and this number increases every year.

### Editors thank to following referees:

P. Barton, B. Bergmann, B. Bezdekova, M. Cada, T. Dohnal, M. Dovciak, V. Gabriel, S. Gerasimov, S. K. Hansen, M. Hejduk, K. Ilkiewicz, T. Jerabkova, P. Kacovsky, A. Khirnov, K. G. Klein, I. Kolmasova, O. Kopacek, L. Kripner, D. Kubaniova, A. Kuzminova, M. La Mantia, L. Leedjarv, H. Libenska, O. Lubynets, M. Milgrom, S. S. Mujumdar, F. Nemeč, D. Nikitin, O. Parlag, G. Pi, P. Pleskunov, V. D. Pustovitov, S. Rednyk, P. Rubovic, M. Ryston, A. Salohub, K. Soustruznik, F. M. Teyssier, M. Tomes, D. Tsiklauri, K. Tuharin, G. Urbancova, J. Urbar, M. Vaidulych, E. Varga, R. Vladioiu, K. Vokurka, M. Wolf, Z. Yan, M. Zanaska, and M. Zofka.



Finally, we would like to express our thanks to all speakers and other participants for helping us to keep a fruitful and friendly atmosphere during the whole meeting as the photo from open-air joint poster session demonstrates. Last but not least, we would like to thank our colleagues and many cooperative students who assisted us greatly both prior to and through the conference.

Pleasant reading

Jana Šafránková and Jiří Pavlů  
Editors