



ALICE Working Group

Sofia University "St. Kliment Ohridski"

Radoslav Simeonov

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РЕПУБЛИКА БЪЛГАРИЯ МИНИСТЕРСТВО НА ОБРАЗОВАНИЕТО U HAVKATA

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Faculty of Physics, Sofia University

- M&O
 - Team Leader Assoc. Prof. Venelin Kozhuharov (0.2 FTE)
 - Deputy Leader Assoc. Prof. Martin Makariev (BAS-INRNE) (0.25 FTE)
- Young Scientists
 - Postdoc Dimitar Mihaylov (1 FTE)
 - PhD student Radoslav Simeonov (0.9 FTE)
 - PhD student Valentin Buchakchiev (1 FTE)
 - PhD student Kalina Dimitrova (0.2 FTE)
 - Master student Katerina Kostova (0.1 FTE)
 - Bachelor student Martina Docheva (0.5 FTE)
 - Engineer Svetoslav Ivanov (0.1 FTE)



Project Coordinators

- Assoc. Prof. Venelin Kozhuharov FoCal-H co-coordinator
- PhD student Radoslav Simeonov Bulgaria Juniors Ambassador
- Postdoc Dimitar Mihaylov PWG-CF-PAG Femtoscopy Coordinator

ALICE Roadmap

- Possibilities for participation in many projects for our young scientists
- Open tasks available for development



Local PWG evolving with time!

vertex

electromagnetic

calorimeter

time-of-flight

ring-imaging tracker

Cherenkov

superconducting

magnet system

forward

tracker

conversion

- ALICE upgrades in LS3 (2026-2028):
- ITS3: a free-standing silicon vertex detector
- FoCal: a high-granularity forward calorimeter

Tracking over a wide momentum range and rapidity coverage

Increased rate capabilities

Improved vertexing

02/20/2025

1.5m

muon

muon chambers absorber

ALICE Upgrade Project



- ALICE Upgrade program
- During LS3 ITS3 and FoCal
- Forward Calorimeter, 7m from interaction point



Fig.4: Starth of FoCal-F and FoCal-H. The rectangular opening in the middle (84×84 mm³) accommodates the beam pipe. The horizontal space visible between the FoCal-E modules is due to the cooling plates. The readout for FoCal-F is on the detector sides, while for FoCal-H it is at the back of the detector. Dimensions are given in





- Study the Gluon Saturation Region
 - Color-Glass Condensate
- FoCal-E: high-granularity Si-W sampling sandwich calorimeter for photons and π^o
- **FoCal-H**: conventional metal-scintillator sampling calorimeter for photon isolation and jets

FoCal Testbeams

- Joined FoCal-H group in autumn 2021
- Participation in detector development, design optimisation, data analysis, etc
- Students education masters and bachelor students were introduced to the experimental physics
- Work possibilities for the next at least 5 years







Femtoscopy group



Financing

- Bulgarian Ministry of Education and Science, within the National Roadmap for Research Infrastructures 2020-2027 (object CERN)
- 50 000 euro initial admission fee
- 15 000 euro per year materials and consumables
- 30 000 euro per year mission funds
- 25 000 euro per year M&O A (common fund)
- 7 000 euro per year consumables and testbeams participation fund
- Total expenses: 77 000 euro per year

Publications

- 7 publications with major contribution
- 137 publications as part of the collaboration

Design and Test-Beam Results of the FoCal-H Demonstrator Prototype ALICE Collaboration • Radoslav Simeonov (Sofiya U.) for the collaboration.

e-Print: 2211.14791 [physics.ins-det], DOI: 10.3390/instruments6040070

Published in: Instruments 6 (2022) 4, 70, Instruments 6 (2022), 70

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Technical Design Report of the ALICE Forward Calorimeter (FoCal)
ALICE Collaboration
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The forward calorimeter of the ALICE experiment at CERN LHC

ALICE Collaboration • Radoslav Simeonov (Sofiya U.) for the collaboration.

DOI: 10.1088/1742-6596/2668/1/012007 Published in: J.Phys.Conf.Ser. 2668 (2023) 1, 012007

Application of the VMM ASIC for SiPM-based calorimetry

I. Bearden (Copenhagen U.), V. Buchakchiev (Sofiya U.), et al.

e-Print: 2403.14577 [physics.ins-det], DOI: 10.1088/1748-0221/19/10/P10009

Published in: JINST 19 (2024) 10, P10009

Performance of the electromagnetic and hadronic prototype segments of the ALICE Forward Calorimeter

M. Aehle (Kaiserslautern U.), J. Alme (Bergen U.), et al.

e-Print: 2311.07413 [physics.ins-det], DOI: 10.1088/1748-0221/19/07/P07006

Published in: JINST 19 (2024) 07, P07006

Study of the deuterons emission time in pp collisions at the LHC via kaon-deuteron correlations

Oton Vázquez Doce (Frascati), Dimitar Mihaylov (Munich, Tech. U. and Sofiya U.), Laura Fabbietti (Munich, Tech. U.)

e-Print: 2412.04562 [nucl-ex]

Neutron Star Properties and Femtoscopic Constraints

I. Vidana (Catania U.), V. Mantovani Sarti (Munich, Tech. U.), J. Haidenbauer (IAS, Julich), D.L. Mihaylov (Munich, Tech. U. and Sofiya U.), L. Fabbietti (Munich, Tech. U.)

e-Print: 2412.12729 [nucl-th]

Constraining the $p\Lambda$ interaction from a combined analysis of scattering data and correlation functions

D.L. Mihaylov (Munich, Tech. U. and Sofiya U.), et al Print: 2312.16970 [nucl-th], DOI: 10.1016/j.physletb.2024.138550 (publication)

Published in: Phys.Lett.B 850 (2024), 138550

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Problems

- Roadmap funding dependent on the national budget
- Financial support sustainability: what's next after the end of the Roadmap funding?
- Inability to have people at the experiment for the whole year
- Lack of engineers/technical crew in Sofia
- No secretariat for the team
- Newly formed group, lack of guidance in the collaboration
- Attract more students (always the main goal...)
- The lack of students and experts leads to overworking the current crew