

NATIONAL ROADMAP FOR RESEARCH INFRASTRUCTURE (2020-2027)

International research infrastructures

Project:

European Organization for Nuclear Research (CERN)

Financial coordinator:

Ministry of Education and Science of Republic of Bulgaria
(MoES)

Consortium:



Sofia University
St. Kliment Ohridski (SU)
(coordinator)

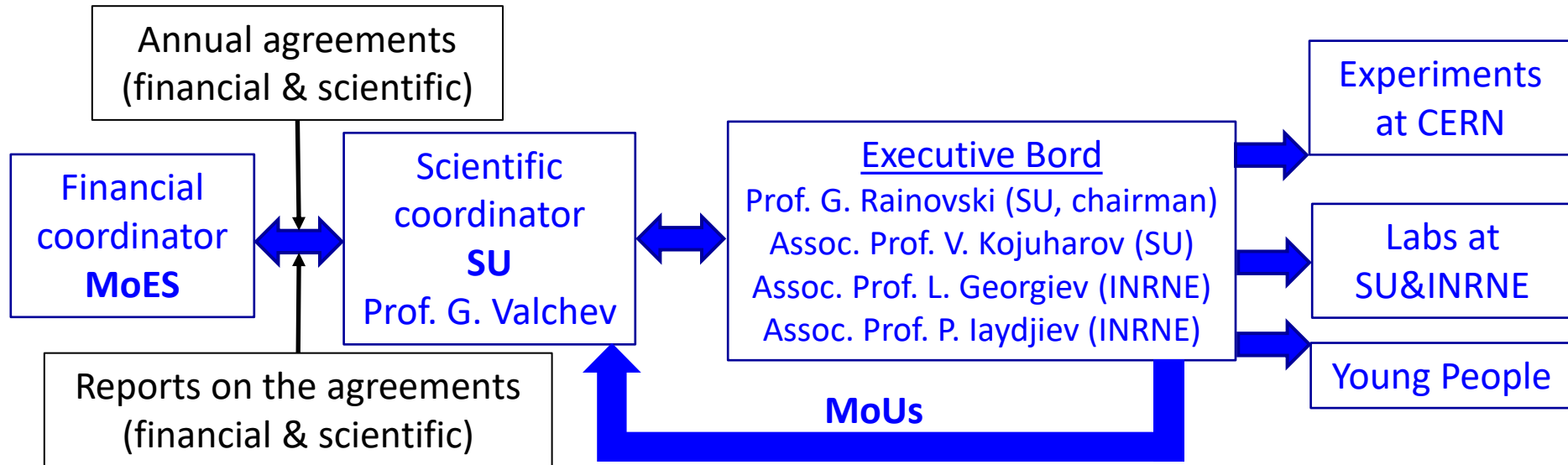


Institute for Nuclear
Research and Nuclear
Energy (INRNE) BAS

**In accordance with the recommendations of the ECFA report
(ECFA/Secr./17/1734, 17.05.2017)**

Project CERN – purpose and structure of the consortium

To ensure the participation of Bulgarian scientists in CERN experiments or activities not financed by other national instruments (**ALICE, NA61, SND@LHC, ISOLDE, SCOAP3**) and to develop national infrastructure that enhances Bulgaria's full scientific and technological cooperation with CERN ⇒ **Scientific action plan 2020-2027**



N.B. The Rector, on behalf of the SU, is signing the MoUs.

Funding is provided for:

- Travel and short-/medium-term stays at CERN.
- Establishing and equipping laboratories for detector development, testing, and data analysis in CERN experiments.
- Attracting students (BSc, MSc, PhD) and young scientists to research conducted by the Bulgarian groups at CERN.

Financial agreements – MoES-SU

- D01-163/28.08.2018 – 2019 – 50 kEUR

In the framework of the 2020 – 2027 program

(duration 1+1 year)

- D01-374/18.12.2020 – 350 kEUR
- D01-175/22.07.2022 – 350 kEUR
- D01-355/13.12.2023 – 383 kEUR
- 12.2024 – 425 kEUR approved but cancelled
in the end of November 2024
- 12.2025 – 508 kEUR requested, under consideration

N.B. The funds and budget timeline for 2024, 2025, 2026, and 2027 will be decided upon the adoption of the national budget for 2025.

Distribution of the funds

I) Contributions to the common funds of CERN experiments in accordance with the signed MoUs ~ 25%

- **ALICE** – MoU signed in 2021, automatically renewed every 5 years, BG representative: Assoc. Prof. V. Kojuharov, BG contribution: **25 kCHF**, paid in 2021, 2022, and 2023, and **not paid in 2024 and 2025**.
- **NA61/SHINE** – MoU signed in 2021, BG representative: Assoc. Prof. M. Bogomilov, BG contribution: **15 kCHF** (flat rate), paid in 2021, 2022, and 2023, and **not paid in 2024 and 2025**.
- **SND@LHC** – MoU signed in 2022, valid until 2025, BG representative: Assoc. Prof. M. Bogomilov, BG contribution: **10 kCHF** (flat rate), paid in 2022 and 2023, and **not paid in 2024 and 2025**.
- **ISOLDE** – MoU signed in 2021, valid until 2024 (a new MoU from 2025 onward is still not signed by BG), BG representative: Prof. G. Rainovski, BG contribution until 2024: **30 kCHF** (flat rate) (to increase to 60 kCHF from 2025), paid in 2021, 2022, and 2023, and **not paid in 2024 and 2025**.
- **SCOAP³** – MoU signed in 2022, valid until 2024 (a new MoU from 2025 onward is still not signed by BG), BG representative: Assist. Prof. M. Naidenov, BG contribution until 2024: **10 kEUR** (flat rate) (to increase to 12 kCHF from 2025), paid in 2022 and 2023, and **not paid in 2024 and 2025**.

Distribution of the funds

II) Establishing and Equipping Laboratories for Detector Development, Testing, and Data Analysis in CERN Experiments

~ 35% (1/1 SU/INRNE)

- **WP1 – INRNE** – *Laboratory for Gas Multi-Detector Systems for Ionizing Radiation*, status: operational, related to activities at CMS.
- **WP2 – INRNE** – *Grid and Cloud Technologies*, status: operational, related to activities at CMS.
- **WP3 – SU** – *Grid and Cloud Technologies*, status: under upgrade, with a tendency to move to another infrastructure (HPC complex Discoverer), related to activities at CMS.
- **WP4 – SU** – *Laboratory for the Development and Study of Scintillation Detectors*, status: under construction/operational, related to activities at ALICE, NA61, and SND@LHC.
- **WP5 – SU** – *Laboratory for the Development and Characterization of Detectors for Nuclear Spectroscopy*, status: under construction/operational, related to activities at ISOLDE.
- **WP6 – SU** – *Laboratory for Ionizing Radiation Detectors for High-Precision Measurements*, status: under construction, related to activities at CMS.

Distribution of the funds

- III) Travels and short-/medium-term stays at CERN ~ 20%
- IV) Attracting students (BSc, MSc, PhD) and young scientists to research conducted by the Bulgarian groups at CERN and other expenses ~ 15%
- V) Administrative expenses 5%

Results 2021 - 2024

- 1) Bulgarian groups are actively involved in ALICE, NA61, SND@LHC, and ISOLDE experiments.
 - Bulgaria became a member of SCOAP³ initiative.
- 2) 100 papers in international journal.
- 3) 6 laboratories are established and (almost) operational at SU and INRNE.
- 4) 19 students are attracted in conducted research as 3 of them are PhD students (one is about to defend).

Problems and risks

- 1) The Financial Stability within the Framework of NRRI Programs
- the Evaluation of the NRRI in 2027.
- 2) Double activities and the necessary efforts to avoid double financing – financing the Bulgaria's participation in CERN is complex.
- 3) Electricity costs – in 2024, the electricity bill for the GRID center at Sofia University amounted to 25 kEUR (covered by Sofia University).
- 4) Political risks – a widely shared opinion within the Bulgarian scientific community “HEP (and NP) research is outdated, overrated, and overfunded.”
 - In 2022, a new “Career Development Policy for Academic Staff “ was proposed, specifically aimed at hindering career progression in HEP research (BLOCKED).
 - In 2022, all scientists conducting research at CERN or JINR Dubna were explicitly banned from participating in scientific projects under Bulgaria's National Recovery and Resilience Plan (mitigated at the university level).
- 5) Visibility of Bulgarian’s scientific contributions at CERN at national level.
- 6) The size of the HEP and NP community and the attractiveness of the research.