

Exotic multi-quark states and baryon spectroscopy workshop

Universitätsclub Bonn, the University of Bonn



HORIZON 2020

STR  **NG-2020** Status and Prospects

Boris Hippolyte (Université de Strasbourg / IPHC)
for the **STRONG-2020 Executive Board**



“The strong interaction at the frontier of knowledge: fundamental research and applications”

Consortium Agreement

- **46 participating institutions** (beneficiaries) in

- **16 countries:**

Austria, Belgium, Switzerland, Germany, Spain, Finland, France, Croatia, Ireland, Italy, Montenegro, Netherlands, Poland, Portugal, Sweden, United Kingdom

- **Location details can be found on online [Google map](#)**

- **121 other Involved Institutions** (not receiving EU funding)



H2020-INFRAIA-2018-1
Type of Action: RIA
Grant Agreement N°824093



1 June 2019 to **31 July 2024**
(62 months)



32 Work Packages (WPs)



46 participating
institutions

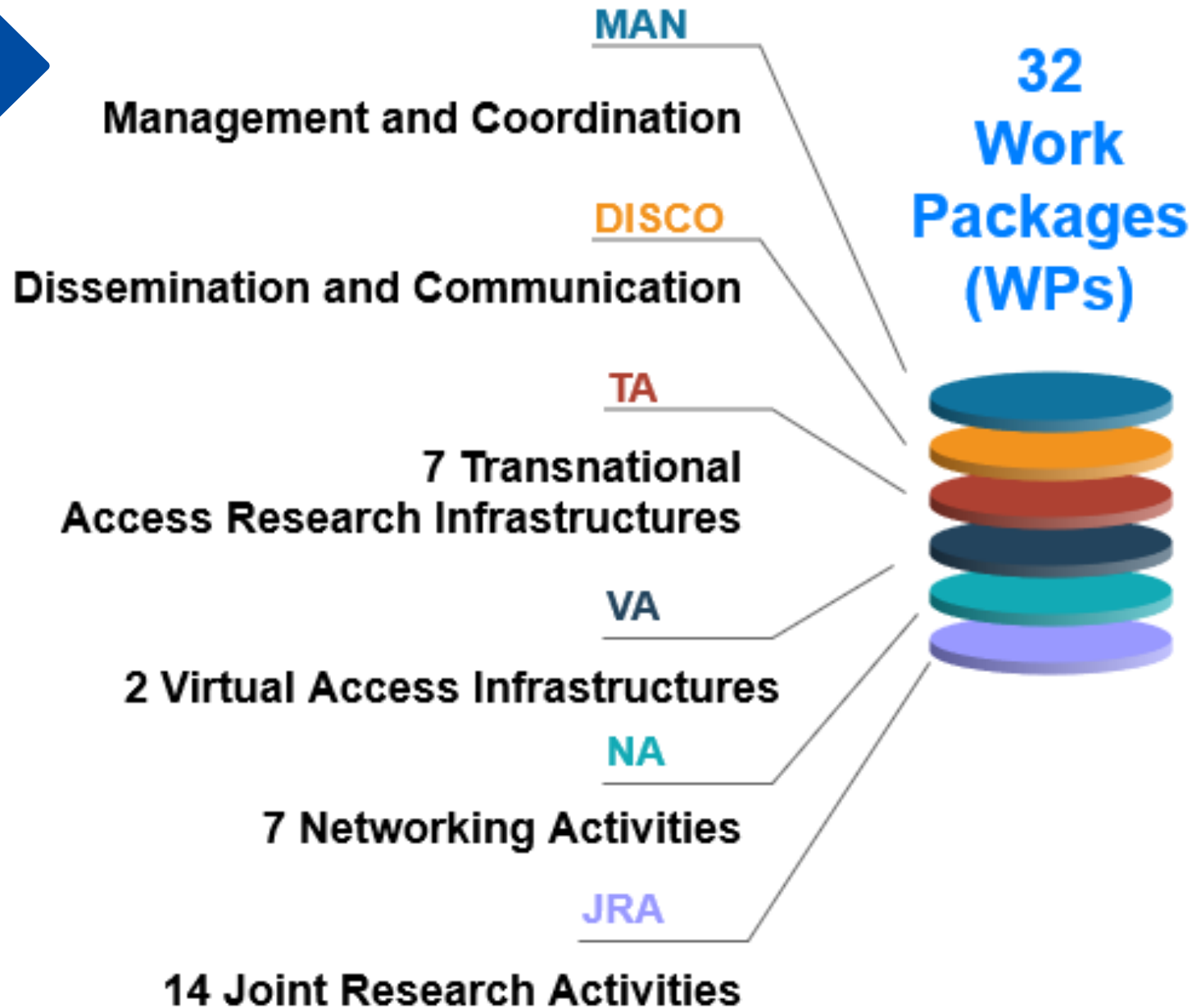


Budget 10 M €



<http://www.strong-2020.eu>

The last version of the Grant Agreement (currently in force) is available in the Participant Portal and on the official web-site:
News & Documents – Project Documents – Third Amendment





Management team	Executive Board	Governing Board	Facility Coordination Panel
<ul style="list-style-type: none">• Scientific Coordinator Barbara ERAZMUS (CNRS)• Deputy Scientific Coordinator: Carlo GUARALDO (†) (INFN)• Project Manager: Emine AMETSHAEVA (CNRS)	<ul style="list-style-type: none">• Barbara ERAZMUS (CNRS)• Carlo GUARALDO (†) (INFN)• Boris HIPPOLYTE (University of Strasbourg)• Chiara LA TESSA (University of Miami)• Frank MAAS (JGU Mainz)• Hervé MOUTARDE (CEA)• Carlos SALGADO (USC)• Laura TOLOS (USC)	<ul style="list-style-type: none">• Chairperson Elena GONZALES FERREIRO (USC)• The complete lists of members	<ul style="list-style-type: none">• Chaired by Scientific Coordinator• Dieter GRZONKA• Achim DENIG• Catalina CURCEANU• Hartmut SCHMIEDEN• Yvonne LEIFELS• Ubirajara van KOLCK• David D'ENTERRIA• Jean-Philippe LANSBERG• Valerio BERTONE

COSY

- Dieter Grzonka
Jülich, Germany



LNF

- Catalina Curceanu/
Carlo Guaraldo
Frascati, Italy



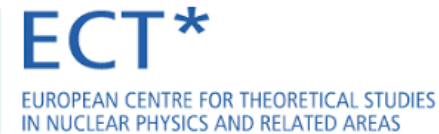
MAMI

- Achim Denig
Mainz, Germany



ECT*

- Gert Aarts
Trento, Italy



GSI

- Yvonne Leifels
Darmstadt,
Germany



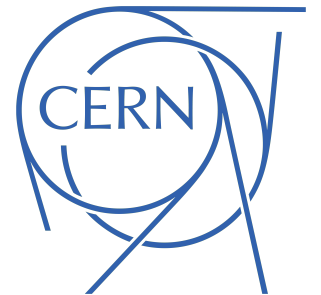
**FTD/
ELSA**

- Hartmut Schmieden
Bonn, Germany



CERN

- David d'Enterria
Geneva, Switzerland



Scientific publications

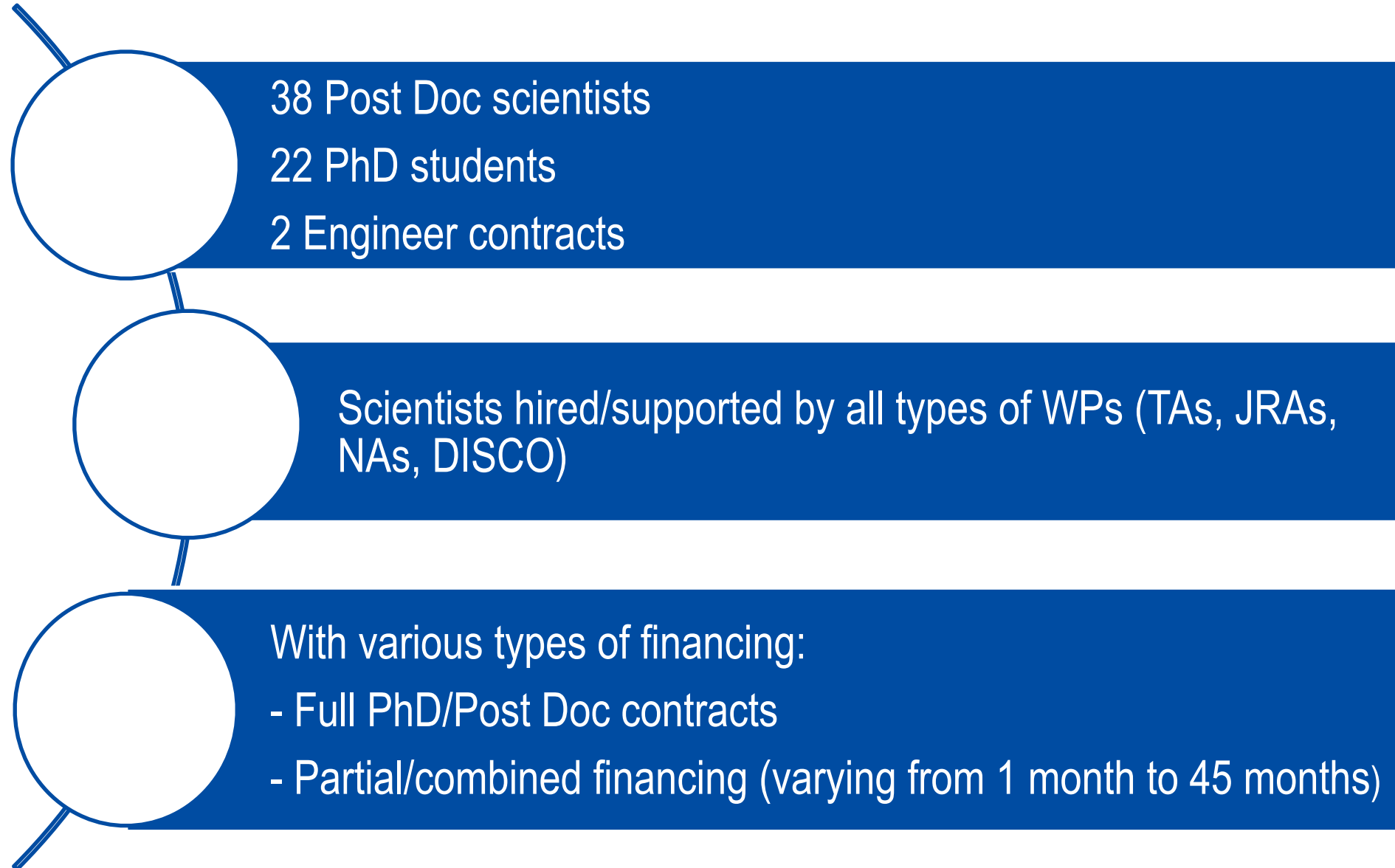
- 377 publications already validated in the Portal
- 151 project Open Datasets

Events organised with project support

- 118 conferences and workshops organised
- 29 press releases
- 19 public lectures

Scientific community supported by the project

- 481 participants to the Workshops
- 208 participants to the Conferences
- Young researchers hired and/or supported in the frame of the project (details next slide)



Second extension



- Additional **8 months extension** was requested by the Consortium
- Justified both by the consequences of COVID-19 and the energy crisis (Russia's aggression against Ukraine)
- Accepted by the EU Commission in June 2023

Last amendment



- Budget modifications and transfers for certain WPs
- Adjustments of work plans to the new project duration
- Definitively accepted by the Commission on 7 June with the entry into force of the modifications from 1 March 2024

STRONG-2020 Kick-off meeting: October 23-25, 2019

Nantes, France: <https://indico.in2p3.fr/event/19715/>

STRONG-2020 Annual meeting: October 13-16, 2020

Online Meeting: <https://indico.in2p3.fr/event/20784/>

STRONG-2020 Annual meeting: November 8-10, 2021

Nantes, France: <https://indico.in2p3.fr/event/25163/>

STRONG-2020 Annual meeting: October 18-20, 2022

Paris, France: <https://indico.in2p3.fr/event/27767/>

STRONG-2020 Annual meeting: November 20-22, 2023

CERN, Switzerland: <https://indico.cern.ch/event/1264833/>

(LAST) STRONG-2020 Annual meeting: June 20-22, 2024

Frascati, Italy: <https://indico.in2p3.fr/event/32198/>

Topical meetings organised by different project WPs can be found on the project Web site,

[EVENTS: MEETINGS](#)



17-19 June 2024
Frascati, Italy

Workshop “Present and future perspectives in Hadron Physics”

Aimed at gathering a broad Hadron Physics Community actors, especially external speakers
The Executive and Dissemination Boards as organising Committee
Scientific program and list of speakers: <https://agenda.infn.it/event/38467/>

20-21 June 2024
Frascati, Italy

Last Annual Meeting of STRONG-2020

Classic Annual Meeting format with a review of the activities of all WPs during the whole project
Discussion of the Consortium future and perspectives for Hadron Physics in Horizon Europe
Full agenda: <https://indico.in2p3.fr/event/32198/>

25-27 June 2024
Bonn, Germany

Exotic multi-quark states and baryon spectroscopy workshop

Final workshop of the Strong-2020 transnational access for FTD-Hadron/ELSA
Full agenda: <https://indico.hiskp.uni-bonn.de/event/513/>

Highlight directions beyond STRONG-2020

Upgrade and merge of BGOOD & CB experiments

polarised target

CB calorimeter

“Open Dipole”

PANDA forward endcap calorimeter

Tagger Magnet

Si-Pixel Detektor

Crystal Barrel

Pol. Target

Tagger-Hodoscope

preliminary

GEMs

Straw tubes

ToF

hodoscope Si pixel detector

GEM tracker straw tubes

side view

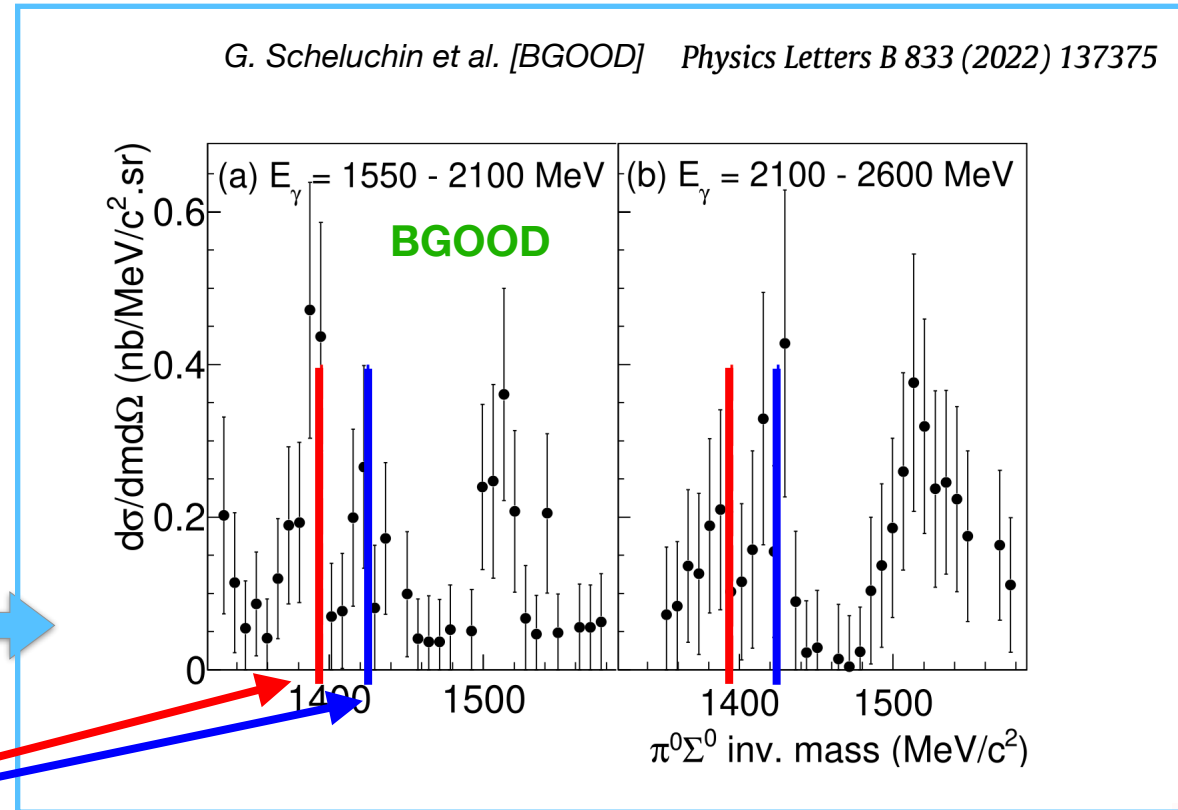


Highlight directions beyond STRONG-2020

Upgrade and merge of BGOOD & CB experiments

Physics case

- Map out Y^* spectrum & threshold effects
- Understand structures in analogy to c & b sectors
- Y^* important background for c sector analyses (LHCb)
- Study emergence of complex bound states (e.g. multi-quark, hybrid)
- Two pole structures extracted from ChPT, e.g. $\Lambda(1405)$

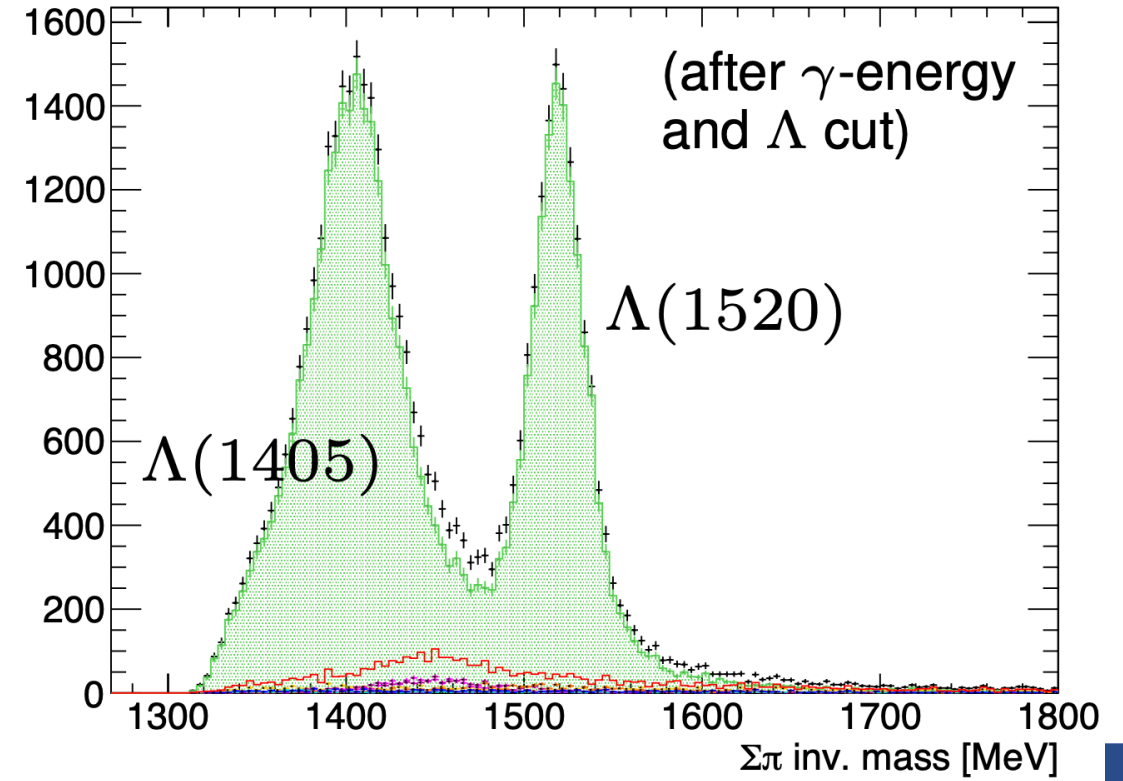
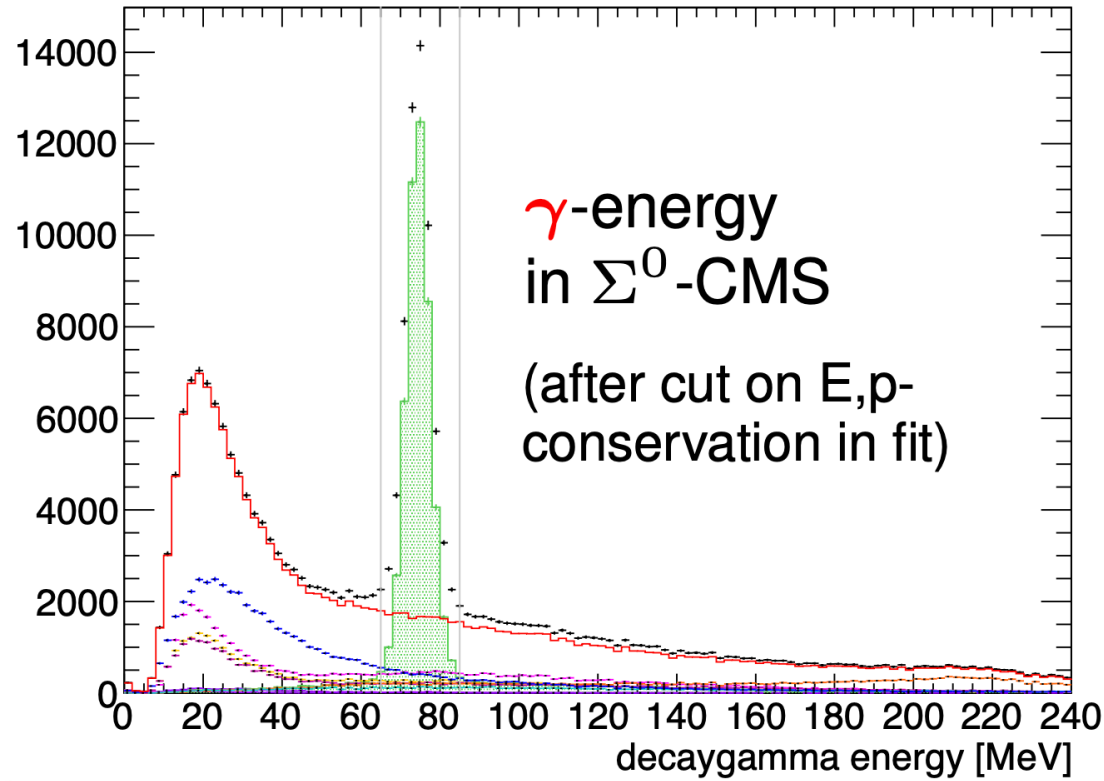
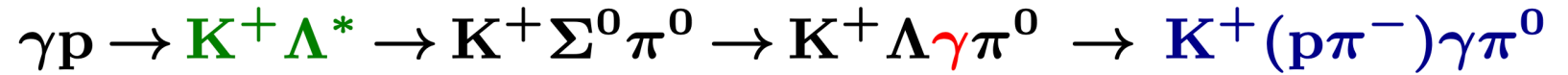


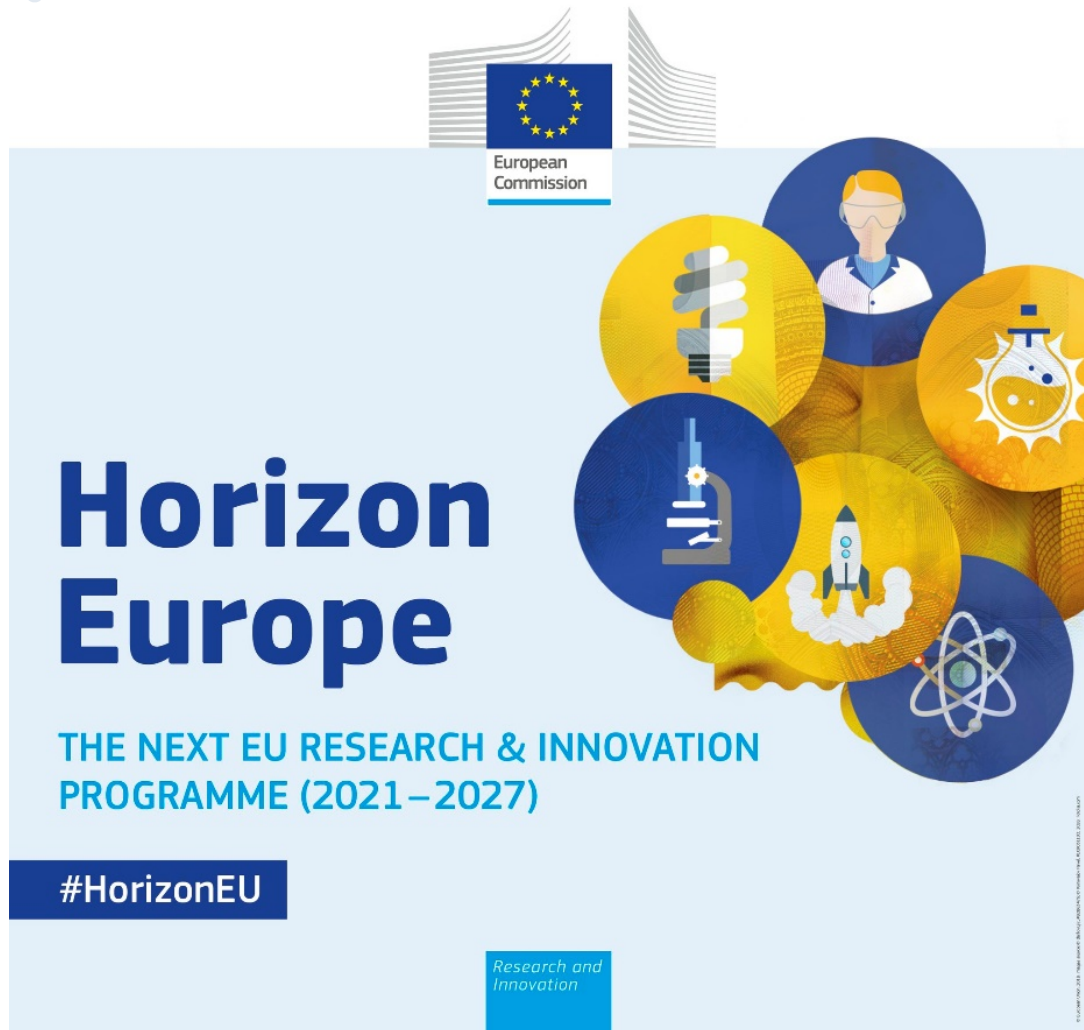
low / high $\Lambda(1405)$ pole ChPT

Fig. 9. The $\pi^0\Sigma^0$ line shape for $\cos(\theta) = 0.86$ to 1.00 . The dashed red and blue lines indicate the proposed poles at 1395 and 1425 MeV respectively [13].

Highlight directions beyond STRONG-2020

Simulation for an upgraded experiment





- ➔ Research and innovation funding programme until 2027
- ➔ The programme is built around **three main pillars**:
 - excellent science,
 - global challenges and industrial competitiveness,
 - innovative Europe.
- ➔ More details can be found [here](#)

Three main pillars of Horizon Europe

Pillar 1 Excellent Science

European Research Council

Marie Skłodowska-Curie Actions

Research Infrastructures
EUR 2,4 bn

Pillar 2 Global Challenges and European Industrial Competitiveness

- Clusters
- Health
 - Culture, Creativity and Inclusive Society
 - Civil Security for Society
 - Digital, Industry and Space
 - Climate, Energy and Mobility
 - Food, Bioeconomy, Natural Resources, Agriculture and Environment
- Joint Research Centre

Pillar 3 Innovative Europe

European Innovation Council

European innovation
ecosystems

European Institute of Innovation
and Technology

Widening Participation and Strengthening the European Research Area

Widening participation and spreading excellence

Reforming and Enhancing the European R&I system

Research infrastructure services advancing frontier knowledge (INFRASERV)

- ➔ This topic aims at providing transnational access (on-site or remote) and/or virtual access to integrated and customised RI services for curiosity-driven research in wide scientific domains, offered by a wide range of complementary and interdisciplinary top level research infrastructures.
- ➔ This includes ad hoc users' training and scientific and technical support; limited development of new services; data management, interoperability, EOSC, global standards...
- ➔ **The scientific domains called under this topic are defined for each Work Programme**
- ➔ **Work Programme 2025-2027: still under construction and scientific areas to be included will be known in summer 2024 (preliminary)**
- ➔ *More details about the Research Infrastructures in Horizon Europe can be found [here](#)*

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(Topic proposition)

- ➔ The research in the field of hadron physics addresses fundamental questions, such as the nature of confinement, the origin of exotic hadronic states and the properties of hot and dense nuclear matter. Those studies have a deep impact on the searches beyond the standard model, in astrophysics and strongly coupled systems as well as in particle and condensed matter physics.
- ➔ The hadron physics community is leading, in the frame of the STRONG-2020 project (H2020-INFRAIA), a coherent effort of theoretical and experimental groups complemented with challenging high-technology developments in instrumentation and industrial applications.
- ➔ The Consortium, involving 2000 scientists from 16 European countries, plans to build a new infrastructure initiative taking benefit from the Horizon Europe framework. We propose to extend the scope of the network, beyond the successful results already obtained, and to further federate leading hadron physics groups carrying out **new challenging fundamental, instrumentation and applied research studies** through accelerator collisions.
- ➔ The objective is to support transnational access to major world-class European facilities: two ESFRI landmarks (FAIR and CERN), emerging infrastructures (MAMI and MESA from the excellence cluster in Germany) and LNF Frascati and ECT* in Italy.
- ➔ Virtual open-access to state-of-the-art computer codes will be provided for the high-precision studies of hadron physics.





(Timescale up to now)

- ➔ **June 2023** topic submitted to the EU Programme Committee (PC) by the French Ministry with strong support of IN2P3, CEA, NuPECC, Germany and Italy.
- ➔ **19 October 2023** discussion of orientations
Importance of the topic raised with the support of French, German and Italian representatives in the PC.
- ➔ **9 February 2024** preparation of the Work Programme 2025-2027
France, together with other countries, indicated a **high priority** supporting the topic “Hadron Physics” for the Work Programme 2025
- ➔ **Mai 2024**: draft of the Work Programme prepared by EU Commission
- ➔ **June 2024**: WP 2025 shared with Representatives of the Program Committee
- ➔ **June 2024**: Preliminary information on the Work Programme




(Anticipating next steps)

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- ➔ The next meeting of the EU PC will take place in June 2024 and the first draft of Work Program will be discussed there (after the elections for the European Parliament on 6-9 June 2024).
 - ➔ The following meeting will be organised in fall 2024.
 - ➔ The Work Program will be adopted at the beginning of 2025, with probably shorter than usual proposal submission deadlines.
 - ➔ If the topic for Hadron Physics is approved and included in the Work Program 2025-2027
 - *discussions with the EU and preparation of a new project by Steering Committee*
 - *complete restructuring of the STRONG-2020 project to match the new RI framework in Horizon Europe*



(Questions ? / Answers...)



Thanks for your time and your attention