

# Proposal Evaluation Form

Associated with document Ref. Ares(2018)3671815 - 10/07/2018



## EUROPEAN COMMISSION

Horizon 2020 - Research and Innovation Framework Programme

## Evaluation Summary Report - Research and innovation actions/Innovation actions

**Call:** H2020-INFRAIA-2018-1  
**Funding scheme:** RIA  
**Proposal number:** 824093  
**Proposal acronym:** STRONG-2020  
**Duration (months):** 48  
**Proposal title:** The strong interaction at the frontier of knowledge: fundamental research and applications  
**Activity:** INFRAIA-01-2018-2019

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	FR	2,156,500	21.56%	2,156,500	21.56%
2	OESTERREICHISCHE AKADEMIE DER WISSENSCHAFTEN	AT	92,000	0.92%	92,000	0.92%
3	UNIVERSITE CATHOLIQUE DE LOUVAIN	BE	100,000	1.00%	100,000	1.00%
4	EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH	CH	200,000	2.00%	200,000	2.00%
5	DEUTSCHES KREBSFORSCHUNGSZENTRUM HEIDELBERG	DE	17,500	0.18%	17,500	0.18%
6	FACILITY FOR ANTIPROTON AND ION RESEARCH IN EUROPE GMBH	DE	61,590	0.62%	61,590	0.62%
7	FORSCHUNGSZENTRUM JULICH GMBH	DE	456,000	4.56%	456,000	4.56%
8	GSI HELMHOLTZZENTRUM FUER SCHWERIONENFORSCHUNG GmbH	DE	620,875	6.21%	620,875	6.21%
9	JOHANNES GUTENBERG-UNIVERSITAT MAINZ	DE	1,060,750	10.61%	1,060,750	10.61%
10	RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAT BONN	DE	531,000	5.31%	531,000	5.31%
11	RUHR-UNIVERSITAET BOCHUM	DE	105,500	1.06%	105,500	1.06%
12	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG	DE	22,910	0.23%	22,910	0.23%
13	TECHNISCHE UNIVERSITAET MUENCHEN	DE	106,250	1.06%	106,250	1.06%
14	UNIVERSITAET HAMBURG	DE	52,500	0.52%	52,500	0.52%
15	UNIVERSITAET REGENSBURG	DE	51,250	0.51%	51,250	0.51%
16	WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER	DE	128,125	1.28%	128,125	1.28%
17	UNIVERSIDAD AUTONOMA DE MADRID	ES	38,750	0.39%	38,750	0.39%
18	UNIVERSIDAD COMPLUTENSE DE MADRID	ES	27,000	0.27%	27,000	0.27%
19	UNIVERSIDAD DE SALAMANCA	ES	26,000	0.26%	26,000	0.26%
20	UNIVERSIDAD DE SANTIAGO DE COMPOSTELA	ES	112,500	1.12%	112,500	1.12%
21	UNIVERSIDAD DEL PAIS VASCO/ EUSKAL HERRIKO UNIBERTSITATEA	ES	36,000	0.36%	36,000	0.36%
22	UNIVERSITAT DE VALENCIA	ES	81,500	0.82%	81,500	0.82%
23	JYVASKYLAN YLIOPISTO	FI	71,250	0.71%	71,250	0.71%
24	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	FR	478,500	4.78%	478,500	4.78%
25	RUDER BOSKOVIC INSTITUTE	HR	25,000	0.25%	25,000	0.25%
26	SVEUCILISTE U ZAGREBU	HR	32,500	0.32%	32,500	0.32%
27	THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN	IE	36,250	0.36%	36,250	0.36%
28	CONSIGLIO NAZIONALE DELLE RICERCHE	IT	40,000	0.40%	40,000	0.40%
29	FONDAZIONE BRUNO KESSLER	IT	400,000	4.00%	400,000	4.00%
30	ISTITUTO NAZIONALE DI FISICA NUCLEARE	IT	1,813,250	18.13%	1,813,250	18.13%
31	POLITECNICO DI MILANO	IT	35,000	0.35%	35,000	0.35%
32	JAVNA USTANOVA UNIVERZITET CRNE GORE PODGORICA	ME	36,000	0.36%	36,000	0.36%
33	RIJKSUNIVERSITEIT GRONINGEN	NL	47,000	0.47%	47,000	0.47%
34	STICHTING NEDERLANDSE WETENSCHAPPELIJK ONDERZOEK INSTITUTEN	NL	98,750	0.99%	98,750	0.99%
35	NARODOWE CENTRUM BADAN JADROWYCH	PL	55,000	0.55%	55,000	0.55%
36	POLITECHNIKA WARSZAWSKA	PL	50,000	0.50%	50,000	0.50%
37	THE HENRYK NIEWODNICZANSKI INSTITUTE OF NUCLEAR PHYSICS, POLISH ACADEMY OF SCIENCES	PL	35,000	0.35%	35,000	0.35%
38	UNIwersytet Jagiellonski	PL	25,000	0.25%	25,000	0.25%
39	LABORATORIO DE INSTRUMENTACAO E FISICA EXPERIMENTAL DE PARTICULAS	PT	188,500	1.88%	188,500	1.88%
40	UNIVERSIDADE DE AVEIRO	PT	34,000	0.34%	34,000	0.34%
41	UPPSALA UNIVERSITET	SE	160,750	1.61%	160,750	1.61%
42	THE UNIVERSITY OF BIRMINGHAM	UK	62,500	0.62%	62,500	0.62%

43	THE UNIVERSITY OF EDINBURGH	UK	64,750	0.65%	64,750	0.65%
44	UNIVERSITY OF GLASGOW	UK	126,500	1.26%	126,500	1.26%
Total:			10,000,000		10,000,000	

## Abstract:

The strong interaction is one of the cornerstones of the Standard Model (SM) of particle physics, and its experimental and theoretical study attracts an active community of about 2500 researchers in Europe. The list of fundamental open questions at the frontier of our current knowledge in the strong interaction is very rich and varied including a full understanding of (i) the partonic structure of hadrons, (ii) exotic hadronic states, properties of (iii) dense quark matter and of (iv) hot and dense quark-gluon plasma, as well as (v) precision tests of the SM. Such research topics are studied experimentally and theoretically mostly via particle collisions at low (a few tens of GeV) and high (up to 14 TeV) energies. Associated developments in state-of-the-art detectors/data-acquisition/beams/targets are required, as well as in theoretical (lattice, effective field, perturbative) calculations. The STRONG-2020 project brings together many of the leading research groups and infrastructures involved today in the study of the strong interaction in Europe, and also exploits the innovation potential in applied research through the development of detector systems with applications beyond fundamental physics, e.g. for medical imaging and information technology. The Consortium includes 44 participant groups, embracing 14 EU Member States, one International EU Interest Organization (CERN), and one EU candidate country. Together with host institutions of 21 other countries, without EU funds benefits, the project involves research in 36 countries. The project is structured in 32 Work Packages (WP): 7 Transnational Access Activities, 2 Virtual Access Activities, 7 Networking Activities and 14 Joint Research Activities. Furthermore, 2 WPs take care, respectively, of the "Management and Coordination" of the project and of "Communication and Outreach".

## Evaluation Summary Report

### Evaluation Result

**Total score: 12.50 (Threshold: 10)**

### Form information

#### SCORING

Scores must be in the range 0-5.

#### Interpretation of the score:

- 0** The proposal fails to address the criterion or cannot be assessed due to missing or incomplete information.
- 1 Poor.** The criterion is inadequately addressed, or there are serious inherent weaknesses.
- 2 Fair.** The proposal broadly addresses the criterion, but there are significant weaknesses.
- 3 Good.** The proposal addresses the criterion well, but a number of shortcomings are present.
- 4 Very good.** The proposal addresses the criterion very well, but a small number of shortcomings are present.
- 5 Excellent.** The proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

### Criterion 1 - Excellence

Score: **4.00** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the topic description in the work programme:

Clarity and pertinence of the objectives

Soundness of the concept, and credibility of the proposed methodology

Extent that proposed work is beyond the state of the art, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models)

Appropriate consideration of interdisciplinary approaches and, where relevant, use of stakeholder knowledge and gender dimension in research and innovation content

The extent to which the Networking Activities will foster a culture of co-operation between the participants and other relevant stakeholders

The extent to which the Access Activities (Trans-national Access and/or Virtual activities) will offer access to state-of-the-art infrastructures, high quality services, and will enable users to conduct excellent research

The extent to which the Joint Research Activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures

Research in hadron physics is both theoretically and experimentally very broad as it has to capture rich features of Quantum Chromodynamics (QCD). The goals of the proposal to provide access to six world-class research infrastructures, which complement each other in particle beams, are highly pertinent and in line with the work programme. To significantly enhance development in theory and foster synergy with experimentalists the European Center for Theoretical Physics (ECT\*) has been added to the Consortium.

The objectives of the proposal are in the forefront of current research in strong interaction. Unfortunately, the proposal does not clearly discuss how the project builds upon and goes beyond previous hadron physics projects in FP6 and FP7.

The objectives are logically grouped in three pillars: (a) low-energy and (b) high-energy frontier, (c) instrumentation aiming at combining excellence and innovation. The proposal offers innovative technical potential and synergy in collaboration with the NICA facility at JINR (Russia) and collaboration with top non-European research institutions important for future/planned infrastructures, FAIR (Germany) and Electron Ion Collider (US). The individual objectives combine essentially all aspects of modern hadron physics and define paths towards answering a long list of fundamental questions. This bottom-up approach sets very specific work targets that could however distract the focus of the proposal from the IA call objectives. As requested for the advanced communities the proposal effectively addresses the development of a sustainability roadmap.

The overall concept and methodology are sound and credible. Collective and integrated efforts toward reaching the goals are however not

Consideration of interdisciplinary approaches is reasonable. Gender dimensions are generically addressed, exact measures are not sufficiently elaborated.

The Transnational and Virtual activities offer access to state-of-the art research infrastructures of hadron physics as well as to open-source codes and automated/simulation tools and will thus enable users to conduct excellent research in different areas of hadron physics.

Networking Activities bring, in general, novelty in the field of hadron physics. However, in some of them the networking dimension and the involvement of non-funded partners is not substantiated.

Several JRAs aim at the development of new detector technologies for existing and future instruments, contributing to improvements of the services provided by the infrastructures. Some JRAs are however focused more on scientific goals instead of addressing improvements of infrastructures.

## Criterion 2 - Impact

Score: **5.00** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account:

**The extent to which the outputs of the project would contribute to each of the expected impacts mentioned in the work programme under the relevant topic**

**Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity, create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society**

**Quality of the proposed measures to:**

- exploit and disseminate the project results (including management of IPR), and to manage research data where relevant
- communicate the project activities to different target audiences

The results connected to low- and high-energy pillars will have significant impact beyond hadron physics itself. They will contribute to fundamental research for physics beyond the standard model, impact astrophysics as well as theories of strongly coupled complex systems in condensed matter physics. The progress in instrumentation (3rd pillar) will result in diverse impacts as well. The tools and methodology for new-cutting edge experiments will provide upgrades to RIs enhancing thereby their competitiveness. The developed technologies will impact medicine (diagnostic tools, cancer treatment), industry (line-scan cameras, micro-scale particles, 3D-magnets technology) and may also lead to advances in computing/machine learning.

Training and education activities (including students and postdocs) in the related fields are foreseen and will bring qualified personnel to the job market but their description is not always convincingly presented. Measures to attract new users are proposed, but it is not clear whether these will be effective.

Measures to exploit and manage research data are well outlined. Part of the dissemination will happen in parallel, directly at the RIs that already have their own dissemination teams at their disposal. The communication and dissemination of results is thorough and appropriate, including strategies for targeting not only the hadron community and scientists in general, but also the public, schools and policy makers. Newsletters, meetings, workshops, participation in conferences, peer reviewed articles, reports, white papers, a website, and a Youtube channel are employed, demonstrating the previous experience and a deliberate effectiveness of dissemination. The outlined dissemination plan contains elements of the current state of the art in science communication.

## Criterion 3 - Quality and efficiency of the implementation

Score: **3.50** (Threshold: 3/5.00 , Weight: -)

The following aspects will be taken into account:

**Quality and effectiveness of the work plan, including extent to which the resources assigned to work packages are in line with their objectives and deliverables**

**Appropriateness of the management structures and procedures, including risk and innovation management**

**Complementarity of the participants and extent to which the consortium as a whole brings together the necessary expertise**

**Appropriateness of the allocation of tasks, ensuring that all participants have a valid role and adequate resources in the project to fulfil that role**

The work plan of the project is extensively elaborated and its individual parts can be considered effective. The work plan is composed of a large number of work packages (32): 7 of which are devoted to TA activities (access to RIs), 2 to VA activities, 7 WPs to NAs and 14 to miscellaneous JRAs carried within the project. The content of the work plan assures that the individual project activities will be completed in a timely fashion. The resources that are assigned to individual work packages are in accordance with their objectives and proposed deliverables. However there is an imbalance in some work packages (e.g. WP1, WP2, WP16, WP19) where resources are allocated only to one partner or it is not sufficiently clear what specific actions will be taken to achieve the objectives.

There are some inconsistencies between the GANTT chart and the work package description (eg. WP2, TNAs). A legend for Table 3.1.2 is missing. The data management is explained in Section 2.2.2, however the data management plan deliverable is missing.

The management structure of the project and adopted operational procedures will allow dynamic and efficient communication among the large number of project partners involved (44).

Risk assessment is quite extensive; however, a few mitigation measures are missing (WP20) or are not fully clear.

Project partners bring complementary expertise, something that is also reflected in their roles within respective WPs and management structures. The leaders of individual WPs are internationally recognized experts in their respective area of expertise, which gives a very high credibility to the project. The credibility of the project is also enhanced by including for the first time the CERN laboratory in the hadron initiative. No industrial partners are directly involved in the proposal although they are foreseen to participate in the Dissemination Board.

## Scope of the proposal



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Status: **Yes**

Comments (in case the proposal is out of scope)

*Not provided*

## Operational Capacity

Status: **Operational Capacity: Yes**

If No, please list the concerned partner(s), the reasons for the rejection, and the requested amount.

*Not provided*

## Exceptional funding of third country participants/international organisations

*A third country participant/international organisation not listed in [General Annex A to the Main Work Programme](#) may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). ( For more information, see the [Online Manual](#) )*

Based on the information provided in the proposal, we consider that the following participant(s)/international organisation(s) that requested funding should exceptionally be funded:

(Please list the Name and acronym of the applicant, Reasons for exceptional funding and the Requested grant amount.)

*Not provided*

Based on the information provided in the proposal, we consider that the following participant(s)/international organisation(s) that requested funding should NOT be funded:

(Please list the Name and acronym of the applicant, Reasons for exceptional funding and the Requested grant amount.)

*Not provided*

## Use of human embryonic stem cells (hESC)

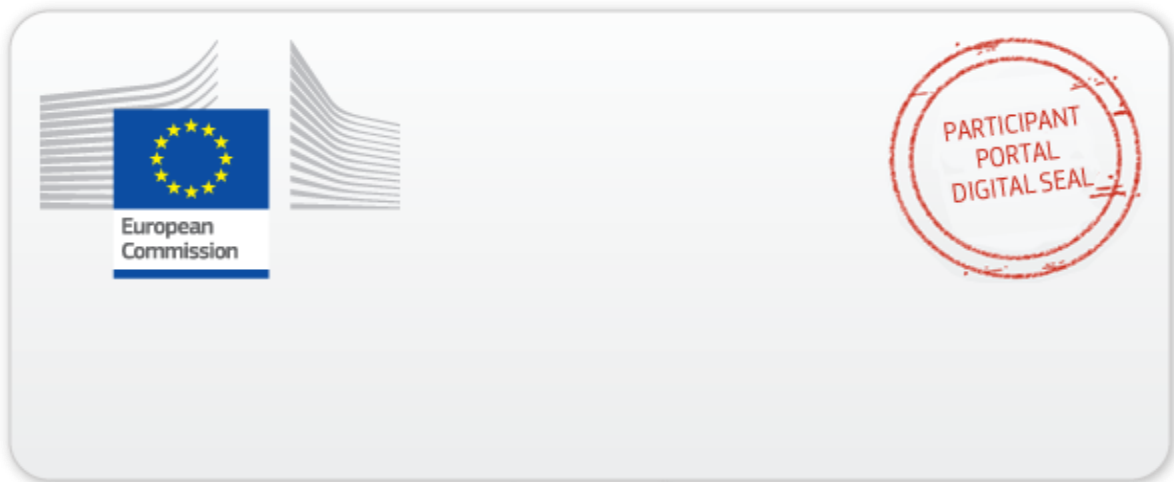
Status: **No**

If yes, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please also state if it cannot be assessed whether the use of hESC is necessary or not because of a lack of information.

*Not provided*

## Overall comments

*Not provided*



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