

Proposal Evaluation Form

Associated with document Ref. Ares(2019)2867938 - 29/04/2019

	EUROPEAN COMMISSION Horizon 2020 - Research and Innovation Framework Programme	Evaluation Summary Report
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Call: H2020-MSCA-ITN-2019
Type of action: MSCA-ITN-ETN
Proposal number: 860836
Proposal acronym: LHCnet
Duration (months): 48
Proposal title: The LHC Network - a global approach to test the Standard Model
Activity: MSCA-ITN-ETN: PHY

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	UNIVERSIDADE DO MINHO	PT	336,770.34	8.80%	336,770.34	8.80%
2	UNIVERSIDADE DE COIMBRA	PT	336,770.34	8.80%	336,770.34	8.80%
3	THE UNIVERSITY OF MANCHESTER	UK	429,494.46	11.23%	429,494.46	11.23%
4	ALBERT-LUDWIGS-UNIVERSITAET FREIBURG	DE	358,116.9	9.36%	358,116.9	9.36%
5	UNIVERSITATEA TRANSILVANIA DIN BRASOV	RO	311,087.76	8.13%	311,087.76	8.13%
6	VRIJE UNIVERSITEIT BRUSSEL	BE	363,120	9.49%	363,120	9.49%
7	Palacky University in olomouc	CZ	332,734.51	8.70%	332,734.51	8.70%
8	STIFTUNG DEUTSCHES ELEKTRONEN-SYNCHROTRON DESY	DE	358,116.9	9.36%	358,116.9	9.36%
9	UNIVERZITA KOMENSKOHO V BRATISLAVE	SK	330,433.08	8.64%	330,433.08	8.64%
10	KOBENHAVNS UNIVERSITET	DK	669,424.5	17.50%	669,424.5	17.50%
Total:			3,826,068.79		3,826,068.79	

Abstract:

The current proposal aims to build a European Training Network (the LHC network, or "LHCnet" for short) that will provide training in data analysis methods, across several physics research groups within experiments which are currently taking data at the Large Hadron Collider (LHC), ATLAS and CMS. To ensure the highest training level for the Early Stage Researchers (ESRs), they will be involved in international research programmes of the highest scientific quality with state-of-the-art techniques applied on High Energy Physics (HEP), as is typically the case of the programmes of those experiments. The ESRs will be exposed to instrumentation and detector development aspects associated to building complex particle physics experiments, to become future experts on HEP, in a broader and integrated way. The LHCnet aims as well to make sure the skills and expertise developed by the ESRs during the course of the current programme, are bridged to society and to the industry, by challenging the ESRs with concrete industrial problems and through dissemination with a dedicated outreach program. The LHCnet proposal involves established experts, from several institutions, with strong expertise in Particle Physics and who belong to research groups with bridges to Astrophysics and Astronomy, from both the experimental and theoretical points of view. The need to develop such a network relies on the fact that testing the current Standard Model (SM) requires a dedicated joint effort from several communities (theoretical and experimental) in order to achieve the ultimate precision in testing the SM as expected in present and future colliders. According to a recent ECFA report, students feel they do not have enough training and expertise in electronics, mechanics, software and instrumentation in general as well as in soft skills, the network intends to propose training through non-academic secondments a significant variety of activities for the wide audience.

Evaluation Summary Report

Evaluation Result

Total score: 78.40% (Threshold: 70/100.00)

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: 0/5.00 , Weight: 50.00%)

Quality, innovative aspects and credibility of the research programme (including inter/multidisciplinary, intersectoral and, where appropriate, gender aspects)

Quality and innovative aspects of the training programme (including transferable skills, inter/multidisciplinary, intersectoral and,

Quality of the supervision (including mandatory joint supervision for EID and EJD projects)**Quality of the proposed interaction between the participating organisations***Strength(s)*

- *This is a very good project, which addresses topics of current interest in particle physics, aiming at extracting high precision information from LHC data. The focus is on top and Higgs physics, having a very high discovery potential. The methodology, which includes modern Machine Learning (ML) techniques applied to global fits of data on a platform common to the two large LHC collaborations is appropriate.*
- *The strong existing ties with a non-academic partner and the common interest in the development of ML-based pattern recognition and classification tools contribute to a fruitful exposure of some ESRs to the industrial sector.*
- *The research training plan, which includes analysis of existing Run 2 data, is effective and appropriate to prepare the ESRs for the Run 3 data, expected two years from now. The training elements will be very efficient since they combine state-of-the-art contacts with LHC experts and very interesting applications of machine learning techniques employed in industry. This will ensure a large spectrum of transferable skills.*
- *The pairing of each ESR with a mentor at another institute, in experimentalist/theorist matching pairs, will improve the networking action, help sharing knowledge, and bring clear benefits to the ESRs.*
- *One important innovative aspect of the training program is the inclusion of 30 short-term trainees. This interesting initiative will allow the impact to be larger than that of a typical network.*
- *The network participants have ample supervision experience and are all well positioned to offer ESRs guidance in their individual projects. The quality of supervision is very good, with each ESR to be monitored by a mentor from a different institution, in addition to the supervisor from the home institution.*
- *A strong interaction between nodes is implicit in the careful secondments plan, which involves several six-months visits of the ESRs, creating useful interconnection in the network. Common analysis tools will be shared among the participating institutions, also enhancing fruitful interactions between the ESRs.*
- *The interaction between most beneficiaries and partners is guaranteed by their common participation in the large international collaborations at CERN which form the basis of the project.*

Weakness(es)

- *The interdisciplinary and intersectoral dimensions of the research programme are insufficiently demonstrated.*
- *The project innovation is limited as the proposed analysis channels, the study of top quark and Higgs, and the interplay between experiment and theory, have been part of Beyond-Standard-Model searches for many years.*
- *The mentioned training in soft skills is limited to the one offered by the non-academic partner, and the description of additional training in transferable skills from the academic sector lacks detail.*
- *It is mentioned that unfolding code will be developed for common use by the network "to avoid duplication of work", but the very development of such a tool seems a duplication; many packages for unfolding exist, particularly for use within high-energy physics.*
- *It is not well described how the joint work involving the two collaborations will effectively operate.*

Criterion 2 - Impact

Score: **3.80** (Threshold: 0/5.00 , Weight: 30.00%)

Enhancing the career perspectives and employability of researchers and contribution to their skills development**Contribution to structuring doctoral / early-stage research training at the European level and to strengthening European innovation capacity, including the potential for:**

a) meaningful contribution of the non-academic sector to the doctoral/research training, as appropriate to the implementation mode and research field

b) developing sustainable joint doctoral degree structures (for EJD projects only)

Quality of the proposed measures to exploit and disseminate the project results**Quality of the proposed measures to communicate the project activities to different target audiences***Strength(s)*

- *A significant number of short-term ESRs will benefit from participation in the network training programme.*
- *The proposed training in machine learning (ML) techniques and statistical methods will be a very good asset for the long-term ESRs and open good career perspectives in both the academic and non-academic sector, due to the quality of the research aspects and to the specific training with a major industrial partner.*
- *The large number of different European institutions involved in the doctoral training, with a major focus on up-to-date ML studies and applications, will reinforce training in a strategic sector throughout Europe.*
- *The planned large involvement of the industrial partner in the training program will offer interesting new perspectives to the trainees.*
- *The foreseen dissemination activities are adequate for the results envisioned by the programme, as they leverage the structures, repositories, and fora best suited for the sharing of knowledge in the scientific domain where the network operates.*
- *The scientific dissemination of results from the network activities is very good, in line with the present high standard of particle physics.*
- *The plan of exploiting the CERN infrastructures for public engagement, especially by involving the fellows in the CERN teachers program*

and in the international masterclasses, is effective and of high impact.

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- The project relies on the strong backbone offered by CERN and DESY for their outreach activities. High quality activities, mostly already in place and to be held at CERN or during network events, will contribute to communications with the public and with high school students, as well as to the training of high school teachers in contemporary particle physics.

Weakness(es)

- The proposed secondment plan reduces the chances of some fellows to be exposed to the non-academic sector.
- The modest exposure to detector and instrumentation could reduce the spectrum of potential future jobs.
- The proposal does not explain clearly how analyses jointly performed by the two different major CERN collaborations will be published as peer reviewed publications, given the usual internal separate publication rules.
- There is no plan to disseminate the feedback from the original HEP-industry partnership proposed here that could be of interest to several other parties.
- There is no convincing plan to involve ESRs or network members in outreach activities through social media, the creation of a blog, or through a network web page.
- Problems related to language differences may limit the effectiveness of the proposed new outreach activity, based on video-conferences to be held once a year, involving different countries.

Criterion 3 - Quality and Efficiency of the Implementation

Score: **3.90** (Threshold: 0/5.00 , Weight: 20.00%)

Coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources (including awarding of the doctoral degrees for EID and EJD projects)
Appropriateness of the management structures and procedures, including quality management and risk management (with a mandatory joint governing structure for EID and EJD projects)
Appropriateness of the infrastructure of the participating organisations
Competences, experience and complementarity of the participating organisations and their commitment to the programme

Strength(s)

- The implementation plan is well structured, with scientific work packages containing clear objectives that synergistically complement each other.
- The allocation of tasks to the participating institutions and to the long-term ESRs is well organized and appropriate.
- The management structure is appropriate, with key persons that already assumed responsibility for the various tasks.
- Network-at-large supervisory and student boards are appropriate to the size of the network.
- All participating organizations possess good infrastructures for a smooth implementation of the work plan and for an excellent work environment of the recruited fellows.
- Access to the worldwide LHC computing grid is guaranteed to all fellows, providing them with the CPU they need for their scientific activities.
- The network includes all the required competences and experience. There is good complementarity between the experiences and competences of the participants.
- The participating organizations, including partners, all possess the highest levels of expertise in fundamental physics research.

Weakness(es)

- The milestone list only includes recruitment and annual reports; this makes the monitoring of the implementation plan difficult.
- As the work plan does not include specific tasks to be performed by the short-term fellows, their role in the network remains unclear.
- The mentioned monitoring of gender balance by the Recruitment Board remains obscure, as no goal to be reached is proposed, nor any guidance vs existing statistics is mentioned. Similarly the emphasis on students from developing countries to be able to take part in the network schools is not accompanied by a description of implementation of specific actions.
- Risk analysis is limited to management, mostly recruitment problems.

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:

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(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

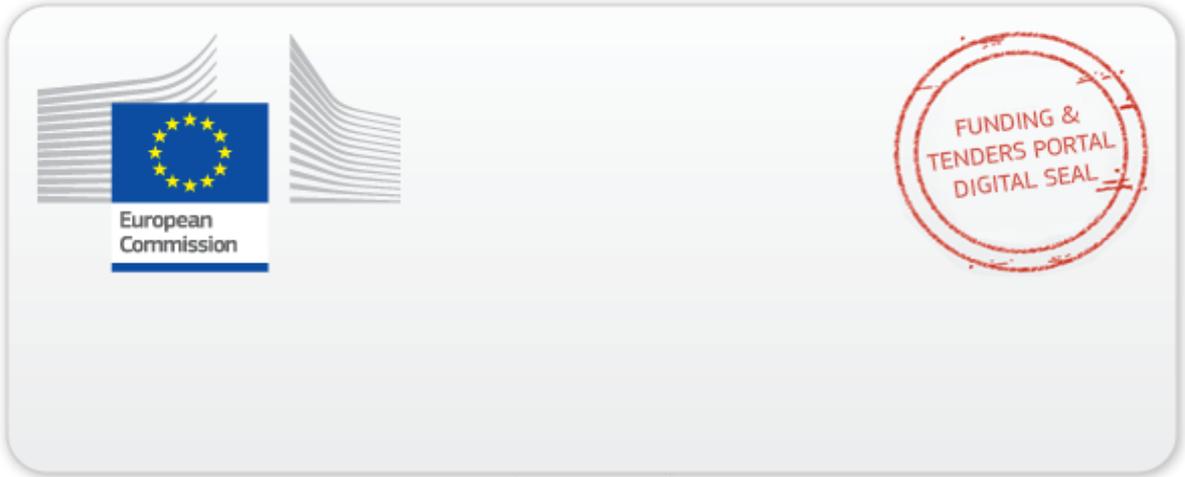
Use of human embryonic stem cells (hESC)

Does this proposal involve the use of hESC?

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



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