

# Proposal Evaluation Form



## EUROPEAN COMMISSION

7 th Framework Programme for Research

## EVALUATION SUMMARY REPORT

**Call :** FP7-PEOPLE-2013-CIG  
**Funding scheme :** MC-CIG (Career Integration Grants)  
**Proposal number :** 631516  
**Proposal acronym :** HPRTERLHC  
**Duration (months) :** 48  
**Proposal title :** High Performance Real Time Event Reconstruction at the Large Hadron Collider

N.	Proposer name	Country	Type	Total cost (€)	%	Grant req. (€)	%
1	ISTITUTO NAZIONALE DI FISICA NUCLEARE	IT					
<b>Total:</b>							

### Abstract :

The goal of this project is to contribute to production of the final prototypes of the electronic boards, the installation and the integration studies of the Fast Tracker (FTK) within the ATLAS data acquisition system. ATLAS is an experiment located at the CERN's Large Hadron Collider (LHC) for proton 14 TeV collision studies. As the LHC luminosity will ramp up to the design level of  $10^{34} \text{ cm}^{-2}\text{s}^{-1}$  and beyond, the high rates, multiplicities, and particle energies in the detectors will pose a unique challenge. Only a tiny fraction of the produced collisions can in fact be stored on tape, while an immense real-time data reduction is needed. FTK is designed to improve the performance of the current multi-level trigger, introducing a coprocessor devoted to the reconstruction of tracks in the whole inner detector. It will operate at a rate of 100 kHz and provide high quality tracks by the start of processing of the high level trigger filters. The FTK processor combines FPGA and ASIC chips to implement real-time complex track reconstruction algorithms, adding a very high computing power with a relative low consumption. The 3D track's trajectories will need to be comparable to normal CPU algorithms in quality and efficiency. The system design is optimized for high-Pt trigger objects, in particular b-jets, tau-jets, and isolated leptons. These objects are particularly important to increase discovery capability of the ATLAS detector because many models predict discrepancies with respect to the standard model, however the selection of samples is difficult at the higher instantaneous luminosity of the LHC upgrade. During the project I expect to have a leading role in the construction of the system and the definition of the physics selection in order to guarantee the best benefits for the ATLAS DAQ system in the use of FTK.

### ESR - Evaluation summary report

#### Marie Curie Career Integration Grants (CIG)

#### SCORING

Scores must be in the range 0-5. Decimal marks may be given.

Interpretation of the score:

0- The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information.

1- Poor. The criterion is addressed in an inadequate manner, or there are serious inherent weaknesses.

2- Fair. While the proposal broadly addresses the criterion, there are significant weaknesses.

3- Good. The proposal addresses the criterion well, although improvements would be necessary.

4- Very good. The proposal addresses the criterion very well, although certain improvements are still possible.

5- Excellent. The proposal successfully addresses all relevant aspects of the criterion in question. Any shortcomings are minor.

#### Criterion 1. S&T QUALITY

Issues to be addressed when assigning an overall mark for this criterion:

- Research/technological quality, including any interdisciplinary and multidisciplinary aspects of the proposal

- Appropriateness of research methodology and approach

- Originality and innovative nature of the project, and relationship to the 'state of the art' of research in the field

- Timeliness and relevance of the project

Please use the following structure in your comments to this criterion:

- Strengths of the proposal (in bullet point format):

- Weaknesses of the proposal (in bullet point format):

- Overall comments:

(reflecting the relative importance of the strength and weaknesses above mentioned)

(copy the text above in the commentbox )

#### Strengths:

+ This ATLAS upgrade is very timely with the discovery of the Higgs and the planned upgrade of LHC.

+ The interdisciplinary aspect is demonstrated through a list of possible applications of the system to other fields. The development may have important applications to medical imaging.

+ The technologies are state of the art, building on past experience with the CDF Silicon Vertex Tracker, but pushing it to a much higher level of requirements.

+ The research methodology for FTK is discussed in detail and is appropriate for the project.

+ The project is both timely and highly relevant.

+ Interdisciplinary aspects: particle physics, computer hardware.

Overall score (Threshold: 3.00/5.00, Weight: 0.30) **4.50**

#### Criterion 2. RESEARCHER

Issues to be addressed when assigning an overall mark for this criterion:

- Research career potential

- Research and technological quality of previous research (2)

- Independent thinking and leadership qualities

- Match between the fellow's profile and project

(2) Any leave of absence in the research career of more than one year such as maternity/parental leave, sick or family care leave, military service, humanitarian aid work, etc. will be taken into account.

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- Strengths of the proposal (in bullet point format):
  - Weaknesses of the proposal (in bullet point format):
  - Overall comments:
- (reflecting the relative importance of the strength and weaknesses above mentioned)  
 ( copy the text above in the commentbox )

*Strengths:*

- + *The researcher has clear leadership abilities, visible from the roles he played during his IOF grant.*
- + *He has a good research track both in data analysis and in instrument design and building, from CDF and ATLAS.*
- + *The match is excellent since those are the final stages, in his home country, of a project he worked on as a student and as a postdoc.*
- + *The researcher's publication record is very good, with personal contribution to collaboration papers, and invited talks indicative of his personal work.*
- + *The research career potential of the applicant will be boosted by the CIG grant as it will support his reintegration period, and provide hopefully recognition for a permanent position.*
- + *There is sufficient evidence that the applicant possesses independent thinking and leadership qualities.*
- + *He has a very broad expertise in the area of algorithms and advanced computing, also on non-standard processors.*

*Weakness:*

- *The proposal does not list any ATLAS or CDF internal reports the researcher might have authored, which is relevant information in large particle physics collaborations.*

*Overall:*

*The CV is lacking in structure, and hard to read.*

Overall score (Threshold: 3.00/5.00, Weight: 0.30) **4.40**

### Criterion 3. IMPLEMENTATION

Issues to be addressed when assigning an overall mark for this criterion:

- Quality of the host organisation, including adequacy of infrastructures facilities
  - Feasibility and credibility of the project, including the work plan
  - Management: Practical arrangements for the implementation and management of the research project (1)
- (1) Sub-criteria to be evaluated in the light of the principles of the 'European Charter for Researchers' and the 'Code of Conduct for the Recruitment of Researchers'. ([http://ec.europa.eu/eracareers/pdf/am509774CEE\\_EN\\_E4.pdf](http://ec.europa.eu/eracareers/pdf/am509774CEE_EN_E4.pdf))

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- (reflecting the relative importance of the strength and weaknesses above mentioned)  
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*Strengths:*

- + *The host institution has the appropriate infrastructures for the researcher, in particular very good electronics services.*
- + *The quality of the host organisation is high and the infrastructure facilities appropriate.*
- + *There are sufficient arrangements for the implementation and management of the research project.*
- + *The project is expected to be feasible and credible as attested by the detailed work plan and the detailed risk-contingency analysis.*
- + *All necessary software licenses are available.*

*Weakness:*

- *Although a lot of detail is mentioned on Frascati's accelerators, very little is said about the Frascati ATLAS team that is the important host of this project.*

Overall score **4.30**

### Criterion 4. IMPACT

Issues to be addressed when assigning an overall mark for this criterion:

- Contribution to research excellence by attracting and retaining first class researchers
- Potential and quality of the researcher's long term professional integration in Europe(1):
- expected impact on the future career development of the researcher
- expected length of the employment contract
- attractiveness of the remuneration package
- Potential of transferring knowledge to the host organisation
- Capacity to develop lasting co-operation and collaborations with other countries
- Plans for dissemination and exploitation of results
- Impact of the proposed outreach activities (1)

(1) Sub-criteria to be evaluated in the light of the principles of the 'European Charter for Researchers' and the 'Code of Conduct for the Recruitment of Researchers'. ([http://ec.europa.eu/eracareers/pdf/am509774CEE\\_EN\\_E4.pdf](http://ec.europa.eu/eracareers/pdf/am509774CEE_EN_E4.pdf))

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*Strengths:*

- + *The long-term perspectives for the researcher are quite good. The CIG will allow him to develop the most innovative parts of the project.*
- + *The project should increase the visibility of the host in the community.*
- + *After the OIF in Chicago and CERN, the fellow is in an excellent position to transfer knowledge to the host.*
- + *The researcher has strong ties in several ATLAS laboratories and will help keep the host international network active.*
- + *Although the core of the project is quite technical, significant outreach actions are planned.*
- + *The CIG is providing roughly 20% of the applicant's funding and will be funding the R&D part of his research. This is not a heavy contribution, but it will provide a prestige to the applicant that can be important for his chances to have a tenured position later.*
- + *There is a clear capacity to develop lasting co-operation and collaborations with other countries, helped by the structure of the ATLAS experiment.*
- + *The project could also lead to the adoption of this technology in medical imaging.*

*Weaknesses:*

- *The position of the applicant is not tenure track.*
- + *Without a description of the local ATLAS group a detailed assessment of impact is not possible.*

Overall score **4.20**

**TOTAL**

Total score (Threshold: 70.00/100.00, Weight: 1.00) **87.30**

**RECOMMENDATIONS FOR NEGOTIATION AND/OR INDICATORS TO MONITOR PROGRESS OF PROJECT:**

**Does this proposal raise ethical issues?**

**Please refer to the list of issues in the Ethical Issues Report (EIR)**

**No**

**Should this proposal be referred to the Ethical Review Panel?**

**No**