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PPRP
Peer Review

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Open (none)

Document Status: With Council

Applicant Details

Applicant	Professor Geoffrey Hall	Organisation	Imperial College London
Applicant	Professor Peter Robert Hobson	Organisation	Brunel University
Applicant	Dr David Michael Newbold	Organisation	University of Bristol

Title of Research Project

Upgrades of the Tracker and Trigger of the CMS experiment at the CERN LHC

Review Information

Response Due Date	07/08/2012	Reviewer Reference:	1-YGYCV

Research Council Contact Details

STFC Administration Contact:	Email:	Telephone:

Strengths

Please comment on the strengths of the proposal. Refer to 'Help' for guidance.

This is an excellent proposal on the Tracker and Trigger upgrades on the CMS experiment.
With the recent discovery of a particle which is consistent with a Standard Model Higgs Boson
the LHC high luminosity upgrades are required to determine the Higgs couplings
and to extend the search for new physics particles, e.g. supersymmetry.
The proposal's objectives are very sound and are based on the excellent track record of the
CMS UK collaboration.

Work packages WP2 and WP3 follow on the current CMS upgrade proposal.
These activities are very well motivated, the UK has established leadership in the areas
of silicon tracker/ read-out and level-1 trigger development.

Work package WP1 presents a sensible, clearly stated management plan.

The work packages all have detailed work plans with timescales and milestones.

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Weaknesses

Please comment on the weaknesses of the proposal. Refer to 'Help' for guidance.

The work package WP4 is an extension of the UK CMS upgrade programme.
While I am confident that CMS UK could deliver this activity, if adequate resources were awarded,
there seems to be insufficient academic leadership for this work package.
71.5 FTE years are requested in total, but there is relatively fewer academics involved
at Imperial and Bristol.
The role of the Brunel group and their responsibilities are not described in enough detail.
There is only one sentence describing Brunel's involvement in WP4.

While I can understand while CMS would like the UK to deliver work package WP4,
the case for all of WP4 is not made convincingly.
Does the UK has to be involved at such a high level of costs?
While the UK is best placed to develop the muTCA-based FED,
couldn't non-UK CMS groups deliver the other parts of the pixel DAQ readout system?

Leadership

How would you rate the UK activity in this area and its international standing and how would you rate the achievement of the team and their leadership in the field, both nationally and internationally?

The UK CMS activity, led by Imperial College, is of the highest international quality.
This effort is led by Prof Hall who is very well known nationally (PI of the current UK CMS programme)
and internationally (project leader of the Tracker readout system).
Their leadership in the CMS experiment has been exemplary.
The work package coordinators are excellent and have
a high international standing, but there is a lack of academic leadership in WP4.

Advancement

How would you rate any potential advancement in the field, and their impact resulting from the proposed project?

The proposal would allow CMS to increase its mass range for new physics, including supersymmetric particles.

International Context

How does the project fit within the international standing?

The proposal is an integral part of the upgrade programme of the
large international CMS collaboration.
The CMS upgrade plans are described in a Technical Proposal (2010).
The UK proposal is a critical part of this programme.

Highlights

How would you rate the past achievements of the team and impact on the field, both nationally and internationally?

The UK delivered important parts of the CMS detector and are now
a leading player in the exploitation phase, including physics analysis, software and Grid computing.

They also have many positions of responsibility.
Most important for this proposal is the fact that the UK is playing a leading role in the CMS upgrade
including the hosting of the collaboration wide upgrade coordinator and the CMS trigger upgrade project manager.

Goals

Do you consider the major goals proposed over the period are appropriate and deliverable?

Yes

Aims

Can the applicant(s) deliver the stated aims

yes

Importance

Please state how important you think it is to fund this project.

The proposal should be funded at high priority,
but a cost optimisation and descope of parts of WP4 should be considered.

Justification

Has the level of requested resources been justified?

The FTE fractions for the existing personel are mostly clearly justified.
This is includes the fractions of academics, RAs and technical staff at the universities and RAL PPD
and the RAL TD staff.

Unfortunately, some of the requested resources are lacking details
and it is not clearly presented why these are required.
The justification of for the new RAs at Bristol, Imperial and RAL PPD
is a bit vague, e.g. "briding trigger ... and firmware .... activities".
It is not clear that these posts are needed without a better justification.
The project-funded postgraduate students are also not justified.

Work package WP2 has an excellent paragraph justifying the equipment costs (total £680k).
The corresponding paragraphs in WP3 and WP4 do not give enough details
to justify properly the equipment costs.
For example in WP3, what is the £774k hardware request for and why is needed.
The total WP3 costs of £1475 is very large. It could be correct, but it should be
better detailed and justified. The largest item is production with £719k.
What is this for? Could this be scaled down if funding is tight?

Similarly in WP4, what is the £651k hardware request for and why is it needed?
This needs to be better described and justified.

A large fraction of the equipment costs for WP2 are for chip production.
It is mentioned that the UK plans to pay about half of this.
For the remaining costs, are there any other CMS groups

which will contribute?

Impact

Comment on the extent to which the proposal shows the potential economic and societal impact of the project and what will be done to ensure that potential beneficiaries have the opportunity to benefit from the research? Please rate your confidence in your ability to evaluate societal and economic impact potential and activities.

The physics at the LHC is having a tremendous impact on society. Not since the moon landings has science been able to generate such a huge interest of the general public.

State-of-the art R&D programmes are the basis for UK PLC to be competitive for large contracts at production stage.

Particle physics attracts the best students and the LHC projects are an optimal training ground for future academics, but also also researchers and enterpreneurs in the private sector.

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Level of Resources

How would you rate the level of resources available to support the credibility of the proposal?

The level of requested resources for this proposal are sufficient to deliver the objectives.

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