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EPSRC Fellowship Peer Review

EPSRC Reference: EP/M029875/1

Document Status: With Council

EPSRC Fellowship - Early Career

Applicant Details

Applicant	Dr Urs Schreiber	Organisation	University of Surrey

Title of Research Project

Higher Theta Functions and Higher CS/WZW Holography

Review Information

Response Due Date	17/02/2015	Reviewer Reference:	053696782

Quality

Please comment on the degree of research excellence of the proposal, making reference to:
(1) The novelty, relationship to the context, and timeliness;
(2) The ambition, adventure, and transformative aspects identified;
(3) The appropriateness of the proposed methodology.
(For multi-disciplinary proposals please state which aspects of the proposal you feel qualified to assess).

This is a very novel intra- and inter-disciplinary proposal which aims at mathematical analysis of geometric quantization of higher dimensional topological fields theories such as 6d conformal field theory and 7d Chern-Simons theory by using cohesive homotopy theory including the applicant's local pre-quantum field theory. This proposal aims to provide many new links between homotopy theory, mathematical aspects of mirror symmetry, field theories and arithmetic and geometric aspects of the Langlands correspondence and its emerging higher versions.

The ambition and adventure of the proposed methodology is outstanding and it is as appropriate as it can be.

The scope of the areas is remarkable.

This proposal contains several directions which can be truly called mathematics of the 21st century.

I wish there are more EPSRC proposals of these type, as opposite to narrow and technical proposals which are still quite common in several mathematical areas.

Importance

Please comment on the national importance of the research. Include how the research:
(1) Contributes to, or helps maintain the health of other disciplines, contributes to addressing key UK societal challenges and/or contributes to future UK economic success and development of emerging industry(s);
(2) Meets national needs by establishing/maintaining a unique world leading activity;
(3) Complements other UK research already funded in the area, including any relationship to the EPSRC portfolio.

The new strategy of EPSRC (November 2014) articulates "for the UK to be the best place in the world to research, discover and innovate ... the UK is to maintain its position as a world-leading location for high quality research, and be equally renowned for its innovation".

This proposal excellently fits into the new strategy. It is considerably different from other UK research already funded in its areas.

Impact

Please comment on the pathway to impact identified for this work particularly: (1) How complete and realistic are the impacts identified for this work; (2) The effectiveness of the activities identified to help realise these impacts, including the resources requested for this purpose; (3) The relevance and appropriateness of any beneficiaries or collaborators

The impact of this proposal will definitely be higher than one expects from funded EPSRC proposals of these type: not only because the proposed research is very intra-disciplinary and will affect several areas, but also through nLab. The latter impacts hundreds of mathematicians and physicists worldwide. Undoubtedly new research results obtained during the proposed work will be appropriately added to the existing network of high quality scientific articles available on nLab.

Ability to Deliver

Please comment on the applicant's ability to deliver the proposed project, making reference to:
(1) Appropriateness of the track record of the applicant(s);
(2) Balance of skills of the project team, including academic partners

The track record is fully appropriate.

I can confirm that indeed that results of this proposal will be very valuable for developments in higher arithmetic geometry, the study of higher zeta functions, and for higher versions of the Langlands program.

The fundamental role of the complex theta functions is very well known. The recent development in arithmetic deformation theory by Sh. Mochizuki involves non-archimedean theta functions as one of the main tools. It will be very interesting to see if the non-archimedean theta-functions will be also eventually related to mathematical aspects of field theories.

Research Vision

Comment on the overall research vision and how the fellowship would enable the applicant to achieve their career aspirations

The overall research vision is outstanding. We really need more applicants of this calibre in this country.

Leadership Potential

Given the applicant's declared current career stage, please comment on their potential (and the expected timescale) for them becoming an international research leader.

I believe the potential of the applicant to become an international research leader is high. Implementations of projects of

this proposal will be an important factor in this relation.

Resources and Management

Please comment on the effectiveness of the proposed planning and management and on whether the requested resources are appropriate and have been fully justified. Please comment explicitly on the viability of the arrangements described to access equipment needed for this project, and particularly on any university or third party contribution

all is very appropriate

Proposal Assessment

Please comment on the extent to which this proposal meets each of the criteria laid out in the call document not already covered by your previous answers

This proposal fits very well the criteria for the EPSRC fellowships.

Overall Assessment

Please summarise your view of this proposal

I would like to encourage the panel members to support this proposal as a priority.

My judgement is that:

1) This proposal is scientifically or technically flawed
2) This proposal does not meet one or more of the assessment criteria
3) This proposal meets all assessment criteria but with clear weaknesses
4) This is a good proposal that meets all assessment criteria but with minor weaknesses
5) This is a strong proposal that broadly meets all assessment criteria
6) This is a very strong proposal that fully meets all assessment criteria

1	2	3	4	5	✔ 6

My confidence level in assessing this is:

Low	Medium	✔ High

Reviewer Expertise

Please indicate your areas of expertise that are relevant to your assessment. Take care not to reveal your identity to the applicant.

geometry and arithmetic, one-dimensional and higher-dimensional, symmetries, versions of the Langlands program and alternative theories