FUSION CENTRE FOR DOCTORAL TRAINING

Collaboratory Report: Peer Review Form

Author

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Peer Reviewer

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Title and abstract

Does the title convey the work done and include important key words? Does the abstract effectively convey the key features and conclusions of the research?

Good abstract that gives an overview of the work undertaken and the outcomes of the project. It would be good to include a title that reflects the excellent work within the paper.
Were there any other people who worked on the project? It may be good to include any collaborators and their research institution in the authors if they contributed a lot to the research.

Introduction/background

Comment on the quality of the description of the background to the research. Does the importance come across effectively? Is the literature reviewed in sufficient depth? Is it clear how the paper will be laid out?

A good introduction is given to spherical tokamaks and why research into plasma heating is important, which is useful for the general reader. Expanding on why a large bootstrap fraction is necessary would really highlight why researching into heating methods is important.

Restructuring the introduction would also emphasise some of the great points made in the introduction, something like:

- Keeping the two first paragrpahs as your introduction explaining STs, bootstrap fraction needs to be high for reduction in current drive (lower cost output electricity etc.), issue about removing the central solenoid and hence this is why research into alternative heating methods is required/here are some alternative heating methods.
- Add a third paragraph in the introduction which is something like your abstract to set the scene for the paper.

Then put all the well explained paragraph on KSUM into the “Modelling Start Up” section.

The literature has been well reviewed with many clear examples of how this work is relevant to many other fusion devices with excellent citations.

Methodology

Comment on how well the methodology of the research is described. Are the methods employed appropriate to address the research problem? Is the approach clearly described?

Explanation of how KSUM works and how it was used to simulate EC current drive is good. The approach is described solving the integral described in equation 2, but for clarity the terms in the equation should be explained.

The microwave imaging reflectometer section shows some good results and initial benchmarking of the diagnostic. I think the section would benefit from explicitly saying what the MIR does, what it measures, and how it is relevant/important to the simulations shown in the first section.

Results and critical analysis

Comment on the quality of the presentation of the results. Have appropriate figures, tables and graphs been employed to convey the results? Are these clear and referenced from the text? How well does the paper discuss the results, and is there in depth critical analysis? Is there an appropriate error analysis?

All graphs are clear and readable, with appropriately labelled axes and descriptive captions. They are all referenced within the main body of the text and are used to justify the conclusions made in the paper. It might be nice to include some of the errors from the MIR diagnostic, but it seems like this work would comes within the scope of the future work described in the conclusion.

Summary / Conclusion

Are the key conclusions / messages presented succinctly? Do the conclusions presented follow from the results and their analysis? If recommendations for future work are provided, are these appropriate?

The key conclusions should be repeated in the conclusions section – they are given but at the end of the first section about the injection threshold limit. But the conclusions presented do follow from the results and analysis, and the scope for future work and extensions sounds feasible. Very good initial results and the prospect of the 2D radial density surfaces is exciting!

References / acknowledgements

Do the references provide an effective background to the project and properly recognise previous research in the area? Are there acknowledgements for funding agencies e.g. Fusion CDT and collaborators not listed as co-authors? Are the addresses of authors complete?

Excellent bibliography, well researched with lots of evidence to show this work is relevant to a wide audience and applicable to almost all current and future fusion devices. The acknowledgements for the funding agencies and other collaborators is given.