Reviewer Response for Manuscript MLST-100670

Dear Editor,

We thank the referee for his or her careful consideration and useful comments. Please find below our detailed responses. We have also made the corresponding changes in the text.

Best Regards,
Petr Mánek (for the authors)

Comments of Referee 1

1. Page 3, Section 1.1, Table 1: Please correct abbreviation *Blanket Structural Fraction (BSM)* defined in Table 1. It should be BSF. While BSM corresponds to *"Blanket Structural Material"*.

   The "BSM" abbreviation was indeed intended to denote "Blanket Structural Material", as can be seen further on in Table 4, where it is associated with "eurofer". In the submitted manuscript, the abbreviation was incorrectly misplaced in Table 1 by one row. We have corrected this error.

2. Page 3, Section 1.1, lines 47-54: Please clarify the meaning of the sentence which currently is trivial and does not convey much sense: *"This represents a significant step forwards in computational fusion-reactor design, as any speed-up achieved in TBR evaluation directly informs a speed-up in numerical optimization of reactor parameters, although such optimization is beyond the scope of the present work."* Particularly, I suspect that its second clause is very doubtful: *"as any speed-up achieved in TBR evaluation directly informs a speed-up in numerical optimization of reactor parameters,"* Maybe, the problems in understanding are related with the phrases *"any speed-up"* – this is too general expression, the second phrase is *"directly informs"* – maybe you wanted to say *"directly connected"*?

   It is true that the wording of this sentence is perhaps unnecessarily complex. Its purpose is to motivate our work in the following sense: if a computationally expensive Monte Carlo (MC) simulation is required in order to evaluate a single instance of reactor parameters (i.e. a single data point of some phase space), it may act as a performance bottleneck prohibiting efficient exploration of that domain. Our surrogate models can be viewed as a possible improvement of this paradigm. If a surrogate model is trained to be sufficiently accurate, it could perhaps completely substitute MC simulations in this process (note that MC would still be needed to train the model). Or alternatively, one could envision a hybrid optimization process where a surrogate model acts as a heuristic that guides the optimization algorithm, prunes the parameter space and reduces the number of calls to the MC. For instance, such approach would be consistent with Branch & Bound strategy.

Since the prediction time of the presented surrogate models is significantly smaller than the runtime of the MC, in both cases we would observe a relative speed-up of the optimization process.

We have rephrased the referenced sentence to better convey this meaning.