

We appreciate Referee 1 careful reading of our manuscript and your candid feedback. We have taken your concerns seriously and revised the manuscript accordingly.

S.No. 1: Referee 1 comment: The approach of extracting general trends by analyzing the three IEA reference turbines (10 MW, 15 MW, and 22 MW) appears overambitious. These designs were developed at different times, by different teams (NREL and DTU), using tools of varying fidelity and maturity.

AC Response: We agree and have reframed the scope and claims to avoid over-generalizing. The revised manuscript now states clearly that the analysis is a comparative mapping of coupling characteristics in the published reference-input datasets, and that any observed “scale progression” is limited to these specific public reference blades rather than an industry-wide trend. We also added an explicit limitations statement noting that the blades differ in design objectives, workflows, and toolchains, and therefore the results should be interpreted as structural fingerprints of the reference inputs, not as universal scaling laws.

Changes made in manuscript:

- Revised the Abstract and Conclusions to emphasize the dataset-limited nature of conclusions.
- Added a dedicated limitations/interpretation paragraph in the discussion/cross-scale interpretation to explicitly acknowledge differences in design lineage and fidelity across the three blades.

S.No. 2: Referee 1 comment: The 15 MW blade was initially designed at low fidelity using NREL’s conceptual design tool WISDEM, and later modeled in SONATA, generating the 6×6 matrices. Cross coupling terms were never monitored during the conceptual design, and were only computed once the design had already been finalized.

The 22 MW blade was designed at higher fidelity from the outset, and its design evolved as the IEA Wind Task 55 team worked to avoid aeroelastic instabilities

The 10 MW blade was designed by DTU back in 2017/2018 using an older design tool. Cross-coupling terms were again not directly monitored.

AC Response: We appreciate this important context and have incorporated it into the manuscript framing. In the revised version, we (i) explicitly state that the three reference blades were developed under different projects and constraints, and (ii) clarify that our method does not assume identical optimization targets; rather, it provides a consistent post-processing of the published BeamDyn sectional matrices to enable “like-for-like” comparison at the matrix level. We also added supporting references in the literature

review to better anchor the discussion around reference turbine development and multi-code/stability considerations.

Changes made in manuscript:

- Expanded literature review to include additional references on coupling metrics, aeroelastic stability relevance of coupling terms.
- Added clarifying language in the methodology and cross-scale discussion emphasizing that the analysis compares published sectional matrices and does not reconstruct each blade's original design workflow.

S.No. 3: Referee 1 comment: The manuscript does not follow the Copernicus template.

AC Response: Agreed. The revised manuscript has been reformatted to align with Copernicus structure and presentation.

S.No. 4: Referee 1 comment: Figures 1, 2, and 3 should be combined into a single plot for clarity.

AC Response: Done.

S.No. 5: Referee 1 comment: Formatting inconsistencies exist (e.g., changes in font size).

AC Response: Corrected.

S.No. 6: Referee 1 comment: The review of existing literature is inadequate. Several citations are missing.

AC Response: Agreed. We significantly expanded the literature review.

S.No. 7: Referee 1 comment: The theoretical background for the normalized coupling coefficient and the mean square root term is too weak

AC Response: Agreed. We strengthened the theoretical foundation by (i) defining the normalized coupling coefficient formally, (ii) explaining its scale-invariant interpretation, and (iii) providing a clearer definition of the RMS coupling intensity as an aggregate indicator (while still analyzing physically meaningful coupling pathways individually).

S.No. 8: Referee 1 comment: BeamDyn files are available, but not in “our” GitHub repository, rather in the public IEA repos.

AC Response: We corrected the data-availability language to attribute the datasets properly to the public IEA/NREL OpenFAST reference turbine repositories, and we clarified what exactly is being used (BeamDyn_blade inputs and associated OpenFAST blade-definition files).

S.No. 9: Referee 1 comment: The sentence on code availability is incomplete and lacks a verb. Is the code available?

Response: We revised the Code Availability statement to be explicit.

S.No. 9: Referee 1 comment: My recommendation would be to target a lower-bar publication, such as a conference proceeding. Events like TORQUE or AIAA SciTech would be suitable venues for publishing smaller studies.

AC Response: We thank the referee for this suggestion; however, we have implemented major revisions to address the raised concerns and hope the revised manuscript now meets the standards of *Wind Energy Science*.

We thank the referee again for highlighting key issues. The revisions substantially improve the manuscript’s positioning, rigor, and compliance with journal requirements.

Regards

Abhishek Sharma

AC