

# Design of a GUI-Based and Testable Post-Processing Framework for Wakefield Simulations using CST Studio Suite



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Proposal for a HiWi Job  
Study field: Computational Engineering | Electrical Engineering  
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## Description

To support post-processing of CST Studio Suite results from the Wakefield and Eigenmode solvers, an existing modular MATLAB workflow is extended with graphical user interfaces developed using MATLAB App Designer. The goal is to develop MATLAB GUIs (App Designer) that provide a unified and user-friendly interface for routine analysis (import, evaluation, visualization, export). The implementation will follow clean-code principles and will be complemented by an automated test suite that verifies selected outputs against analytically solvable benchmark cases to ensure long-term reliability and reproducibility.

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## Task

- Define GUI requirements and user workflow for Wakefield and Eigenmode post-processing
- Implement MATLAB GUIs (App Designer) interfacing the existing post-processing modules
- Apply clean-code practices (separation of concerns, consistent interfaces, readable naming, documentation)
- Integrate standardized plotting and export functions (figures, tables, summary metrics)
- Define analytical benchmark cases for verification and implement automated tests (e.g. `matlab.unittest`) with tolerances
- Documentation: GUI usage and guidelines for extending the code and test suite



## References

- Martin, R. C. (2009). Clean code: A Handbook of Agile Software Craftsmanship. Pearson Education.
- MathWorks, MATLAB App Designer Documentation.
- MathWorks, MATLAB Unit Testing Framework (`matlab.unittest`) Documentation.