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WEST Ion Cyclotron Antenna electrical model digital twin

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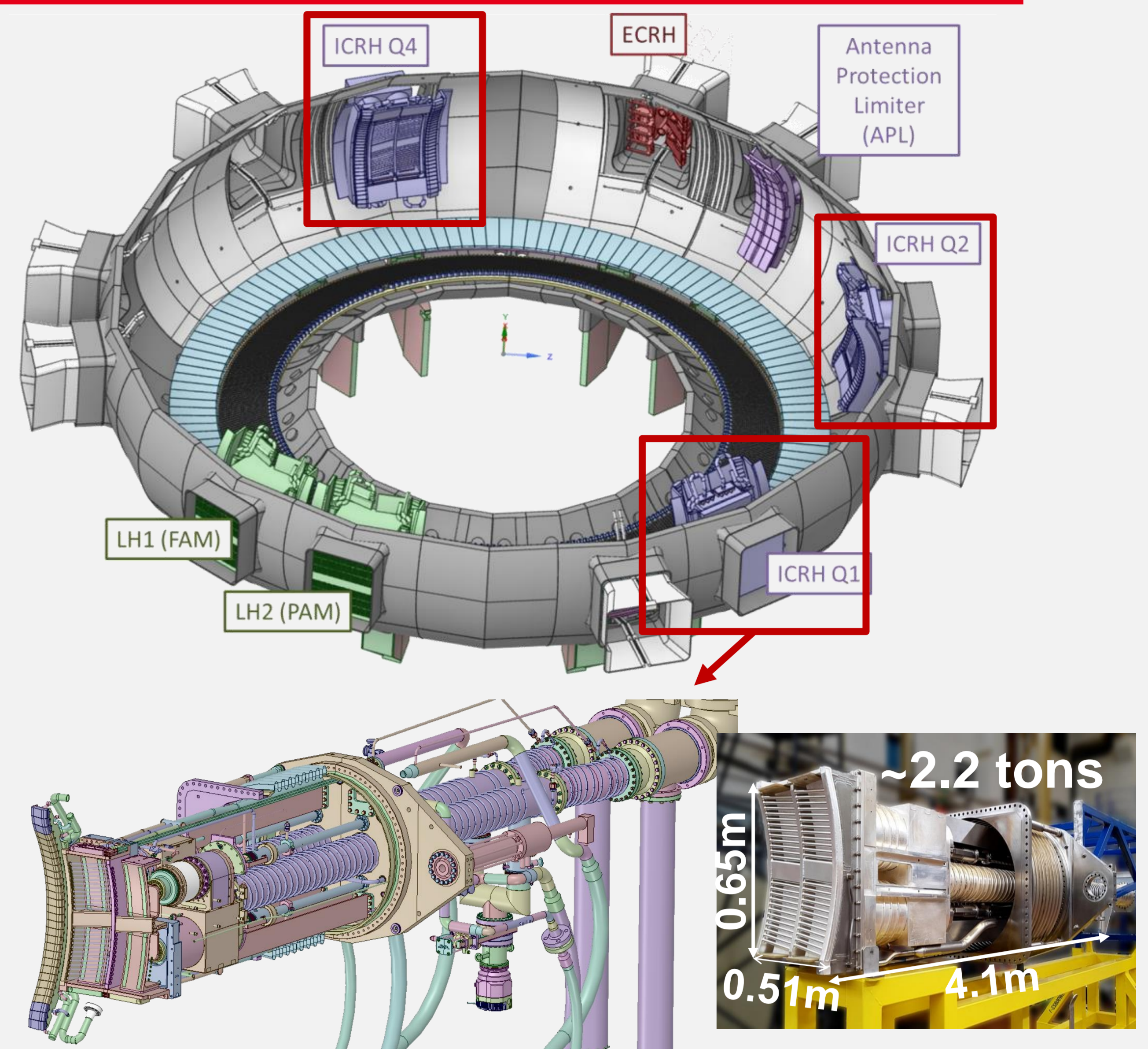
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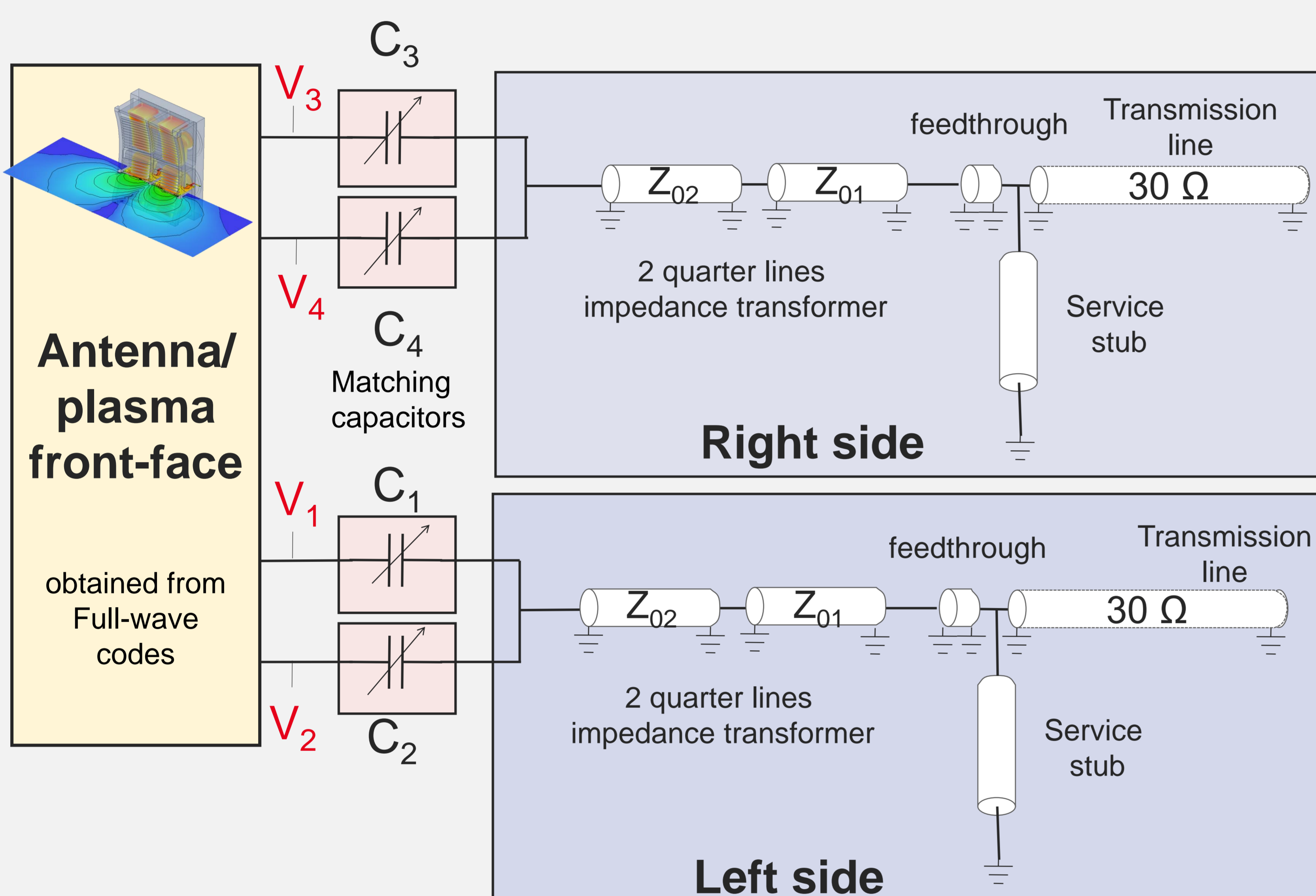
HAL Authorization

Summary

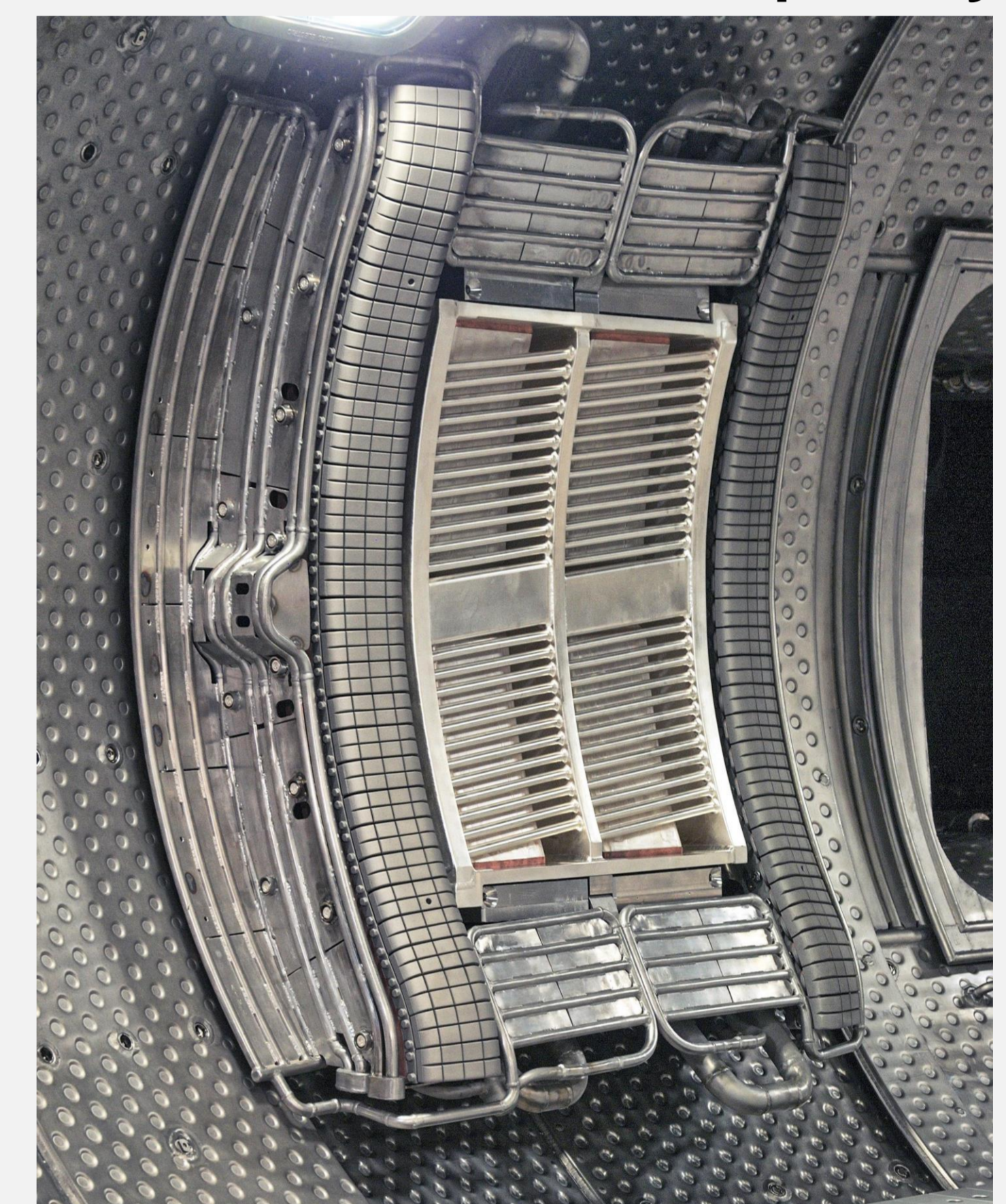
- WEST Ion Cyclotron Resonance Heating (46-65 MHz) antenna RF digital twin
 - Parts calculated from lumped/full-wave codes and assembled with scikit-rf [1].
 - Antenna tuning capacitors can be automatically optimized for a given frequency.
 - Voltages and currents evaluated for a given antenna excitation (power/phase).
 - Model validated vs WEST experiments [2].
 - Extensive documentation and examples [3].
- Help WEST RF operators to select the best antenna settings
- Used by other researchers to deduce input voltages/powers for modelling
- Online web-based interactive GUI provided using [Binder](#).



Electrical Model

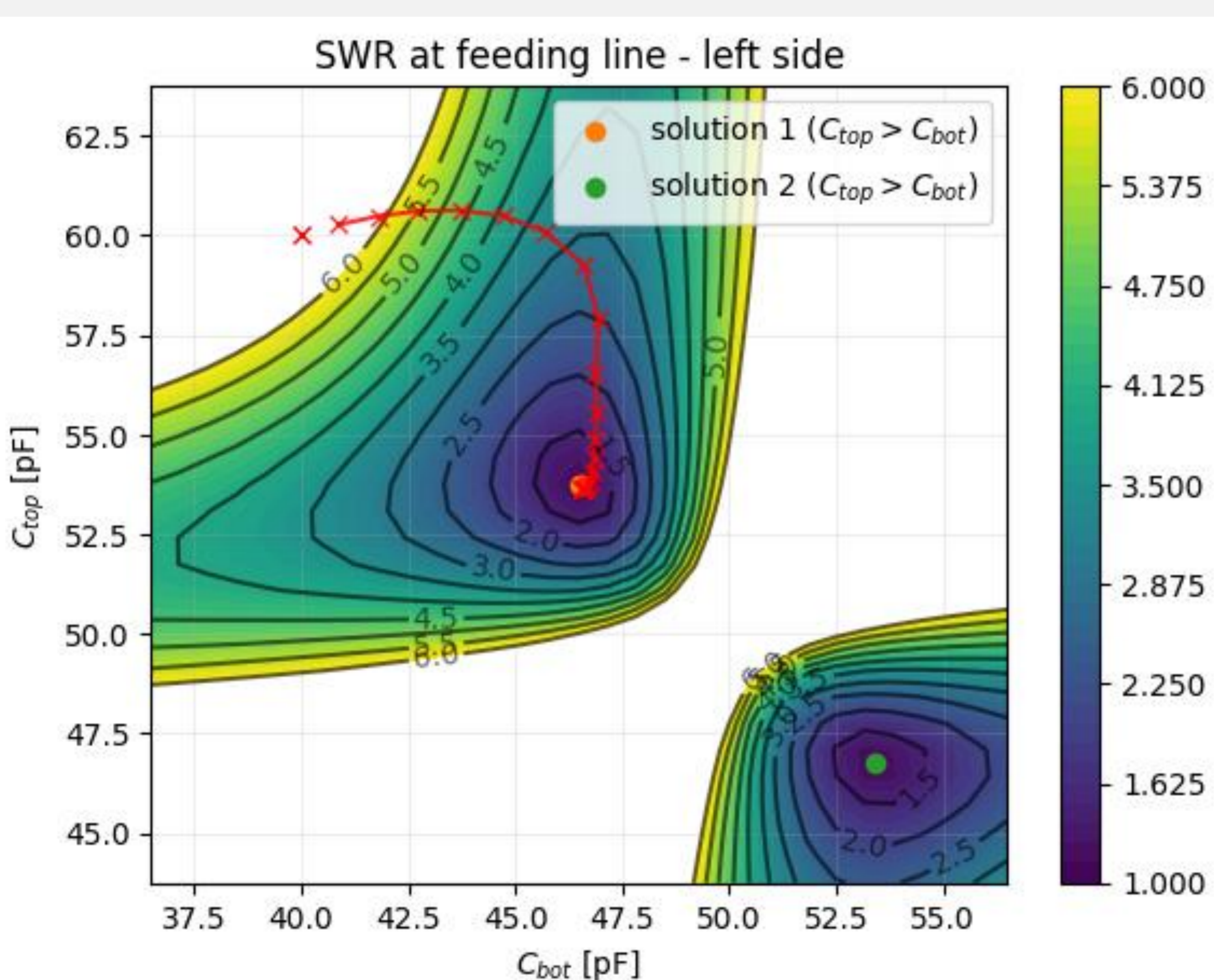


Port 2 3 MW-30 s / 1 MW-1000 s capability (x3)

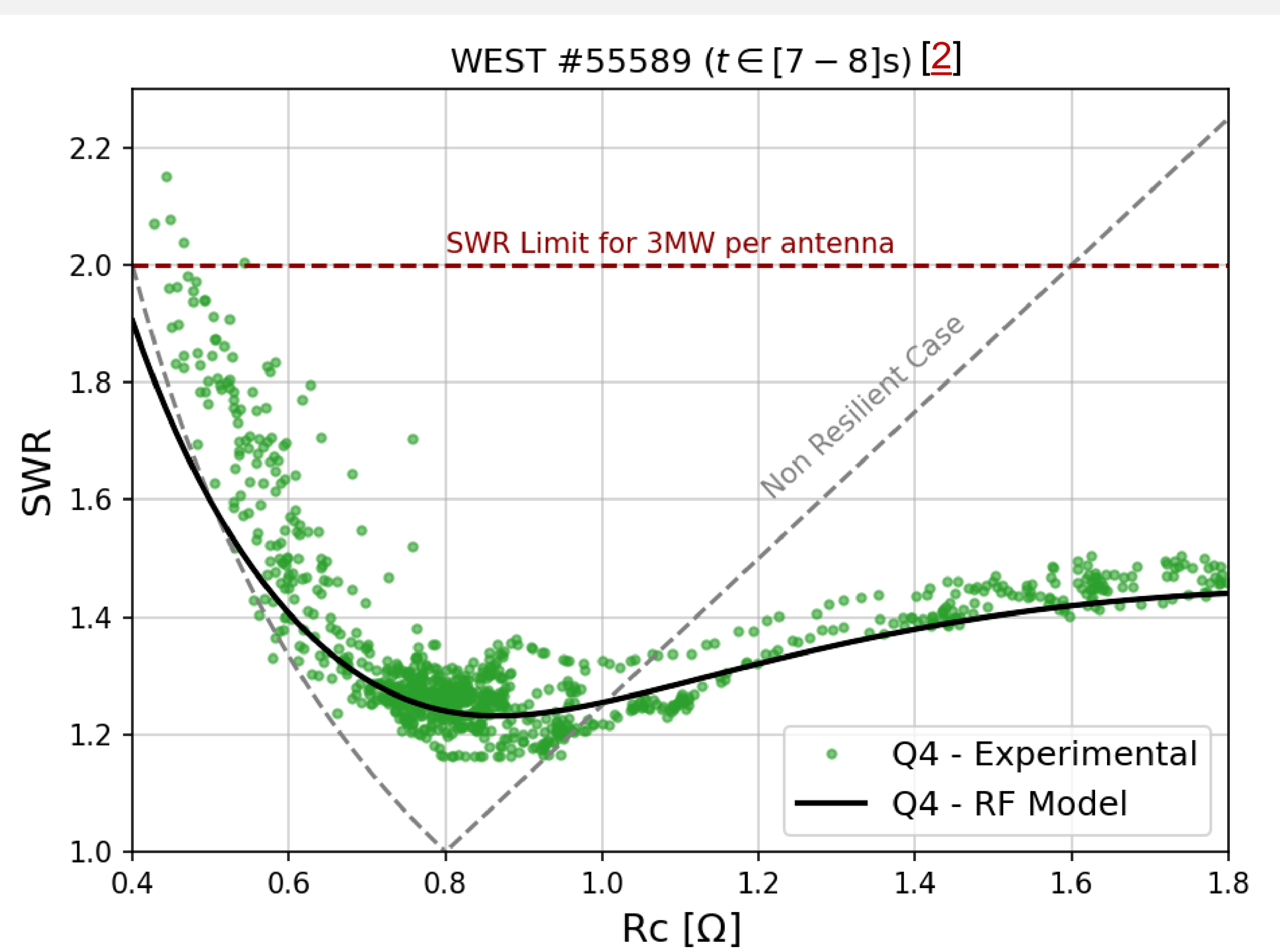


Usage Examples

Matching Algorithm Simulations



Comparisons/Interpretations vs experiments



References

- [1] A.Arsenovic, J.Hillairet *et al.*, [scikit-rf: An Open Source Python Package for Microwave Network Creation, Analysis, and Calibration](#), *IEEE Microwave Magazine*, vol. 23, no. 1, pp. 98-105, Jan. 2022
- [2] J.Hillairet, 2020. [RF network analysis of the WEST ICRH antenna with the open-source python scikit-RF package](#). AIP Conference Proceedings 2254, 070010.
- [3] WEST IC Antenna Python package documentation: <https://west-ic-antenna.readthedocs.io>

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scikit-rf

Object Oriented RF Engineering