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Optimization of tube based RF power amplifiers by 3D EM codes

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Modern electromagnetic computation codes, together with the help of last generation of computers, open new doors for RF design.

A calculation code like CST Microwave Studio®, thanks to its Frequency Domain Solver, is able to calculate S matrix between ports over a given frequency band. In addition, the tetrahedral curved meshing is then able to define accurately very small volumes inside very large structures without reaching a prohibitive number of meshes. As a consequence, a standard computer with 16GB of installed RAM is now able to solve problems with up to 200,000 meshes in a few minutes.

The present communication shows examples of such complex calculations of amplifiers coupled to their load (like an accelerating cavity) by means of small coupling loops. Some reverse engineering of existing designs have been simulated in order to validate the accuracy of the results.

The code also helps to predict the behavior of the amplifier outside its working band in order to avoid problems with the harmonics. Finally, using the eigenmode solver, typical TE modes inside tube structures have been found and the efficiency of special Eccosorb® microwave absorbers has been investigated.

Please indicate preferred presentation (poster or talk?)

poster

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