



Contribution ID: 1654 Contribution code: TUPR38

Type: **Poster Presentation**

Transistor load imbalances within a 6:1 smart combining structure during an output short condition

Tuesday, 21 May 2024 16:00 (2 hours)

For achieving sufficient RF power from a solid state amplifier for accelerate particles applications usually many transistor stages need to be combined. Power levels of more than one kilowatt (kW) per transistor are state of the art for a variety of frequencies. Depending on the required total output power for multi ten kW systems a combining structure is needed. The approach of a sequential multi stage combining bears some advantages. As reflected power also plays a crucial role for the amplifies when used for particle acceleration in a cavity, we investigated the effect of a controlled short within a 6:1 smart combining structure and how it affects the reflected power into the loads in this design. The design we consider is a non-isolating combining with a circulator and load in each single transistor module so that no external customized circulators are needed for this system. Our findings illustrate that strong imbalances can occur, depending on the position of the different modules to each other. We will share experimental and simulation results on findings of a controlled short and the imbalances that can occur.

Footnotes

Funding Agency

Paper preparation format

Region represented

Europe

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Session Classification: Tuesday Poster Session

