

## **SESSION 5: RF Technology**

**Chairman: M. Svandrlik**

The session, dedicated to new developments on RF technology, presented two contributions. One dedicated to the development at the SLS-PSI of a Solid State Amplifier “à la SOLEIL” and the second dedicated to the design and prototyping of a Cavity Combiner (CaCo) by the ALBA team.

### **High Power 500 MHz Solid State Amplifier Development at PSI, M.Gaspar, SLS**

In this talk the development of a Solid State Amplifier (SSA) “à la SOLEIL” but working at 500 MHz (instead of 352 MHz) was presented. The intention is to replace the 180 kW klystron of the SLS booster by a 60 kW SSA, reusing the klystron for the installation of an RF High Power Test Stand. In the presentation a detailed description of the different components configuring the SSA was presented, with special attention to the design of the 250 W 500 MHz module, its characterisation and its stability requirements. The estimated budget for the 60 kW amplifier is 350 kCHF.

#### **Discussion:**

Again, as in previous meetings, the discussion about the need or not of a high power circulator at the output of the SSA was aroused. As a symmetrical and reciprocal device, it is considered to be intrinsically safe, but still some concern about asymmetric failures remained in the audience.

There was also a general agreement that the SSA development will have its time in the future, if the gain of the transistors increases. But some doubt remained about the wiliness of the industry to push the transmitter power up, since there is not a big market of high power SSA.

### **CaCo: High Power Cavity Combiner, B.Baricevi, ALBA**

In this talk the development of a Cavity Combiner (CaCo) to combine the power of two 80 kW IOTs to produce more than 150 kW of output power was presented. An analytical study was first performed in order to establish the basic configuration, and secondly, a Microwave Studio Simulation was done to determine the details of the design. After several iterations, a design with a “plunger” at the output waveguide of the CaCo was optimised to operate with almost 100% transmission efficiency even when only one IOT was in operation. A simpler prototype of CaCo is now being manufactured by THALES for ALBA, with the intention to prove the basic features of the system and its capability to stand the total power.

#### **Discussion:**

Concerns about the stability and safety of the system were aroused. The need of circulators between the IOT and the CaCo was discussed, but this option will just spoil the main CaCo concept, which should mean a safe and cheap combining technique. Also the real need of this development for just 150 kW of output power was discussed, since the possibility of a 150 kW IOT build by CPI was announced. But, also in this case the basic concept is to use commercial IOTs with only small modifications. Also, DIAMOND announced the problems of sparking they have at the 80 kW IOTs just after few days of operation, so the development of a 150 kW IOT was considered out of the possibility of the ALBA project schedule.