6th European Synchrotron Light Sources Radio Frequency Meeting

SESSION 1: Future Projects

CHAIRMAN Summary – M.SVANDRLIK

The first session of the meeting included presentations on two new projects which are in the construction phase, SOLEIL and DIAMOND, and a presentation on the upgrade of the RF system at ELETTRA. P.Marchand started the meeting by describing the SOLEIL RF system, which foresees one amplifier per cavity. While the Soleil superconducting cavity has been already chosen as the accelerating module, there are still discussions undergoing on which power system at 350 MHz should be adopted. An interesting possibility would be to combine five 40 kW solid state amplifiers developed at LURE and already chosen, as a single module, for the booster. A decision wull be taken beginning of 2003. The storage ring cryoplant will be ordered by mid 2003 and delivered after about one year. The system should be installed and tested in April 2005. Also the second presentation, by J. Polian, was dedicated to SOLEIL. The booster RF system, based on a 5-cell LEP cavity powered by a 40 kW Mosfet power amplifier, was presented. It is planned to test in the laboratory at Lure the 40 kW Mosfet amplifier, on a matched load, in December 2003. The part dedicated to SOLEIL was then completed by J.Jacob, who reported on the tests of the prototype of the SOLEIL cavity on the ESRF, with beam. The cryomodule was installed in January 2002 and four testing period were reserved along this year. Very interesting results were presented: the cavity could be parked both at warm and at cryogenic temperature and be completely invisible to the beam. No interaction between the cavity HOMs and the beam were observed. Also the vacuum pressure was very good, even in warm conditions. In fact the cavity behaved as a simple piece of vacuum chamber. The RF conditioning up to 4 MV RF voltage was very fast and smooth. A beam current of 170 mA was stored while the SOLEIL cavity was contributing to the overall RF voltage with 3 MV of accelerating voltage. The concept of this cavity has been thus validated for the ESRF and it is confirmed that it is also well suited for SOLEIL. A series of improvements have been found to be necessary on the prototype, that is many useful findings have been made for the construction of the second cryomodule.

In the second part of the session, the DIAMOND RF system was presented. After a general overview of the project and of the accelerator activities carried out by AsTeC, M.Dykes reported on the linac pre-injector, very similar to the SLS and SOLEIL linac concept, to be ordered mid of December. The superconducting RF cavities will be installed in May 2005. Machine commissioning is scheduled to start in January 2006 and operation for User's in 2007. For the 3.0 GeV machine two current intensity steps are foreseen: 300 mA and then 500 mA. Correspondingly the power to the beam is equal to 536 kW and 893 kW respectively. The RF voltage attains 4 MV. Two superconducting cavities will be installed in the first phase, a third one will be added in a second time. The option for the accelerating module is between the Cornell and the KEK-B superconducting cavities; the choice will be made on the basis of the answers to the call for tender. Also at DIAMOND they intend to follow the scheme one amplifier feeding one cavity; on day one they foresee to have two cavities operational with their amplifiers. At that time there will be already three cryogenic plants installed. For the amplifier the IOT option is the preferred one, given their efficiency, the number of possible suppliers, the availability of very short term spares, the simplicity in replacing a faulty tube. For the present moment they are thinking to combine more IOTs together in a common output cavity; this technique needs still to be fully developed, thus if it is not validated by the time they need it, traditional combination techniques will be applied. The DIAMOND RF system overview was then concluded by A.Moss who described the booster RF system. The booster will provide 3mA at 3 GeV; requirements for the RF are 1.1 MV accelerating voltage and 54 kW RF power. A Petra 5-cell cavity, of the same type used by the CLS, has been chosen. The 60 kW power amplifier will be based on off the shelf IOTs or klystrons. Also in this case the choice will be made on the base of the call for tender. Low level systems will be provided with the cavity by ACCEL. The system is designed for top-up operation 24 hours a day. Installation is scheduled for the second half of 2004.

The closing talk was given by A.Fabris, who presented the RF upgrade project at ELETTRA. Given the increasing number of insertion devices installed on the machine, in particular the superconducting wiggler, at ELETTRA it is necessary to increase the RF power available for the beam. The upgrade project has been therefore launched; different steps are foreseen. The first step, the so called phase "A", has been approved and activated. It foresees the installation of a new RF cavity, belonging to the second generation of ELETTRA-type cavities, and the replacement of one existing 60 kW power plant with one attaining 140 kW. The alternative between IOTs and klystrons has been extensively studied. With the supporting opinion of a dedicated international Adivisory Committe, the choice has been for IOTs. There are two possible options: either to combine two 80 kW IOTs or three 50 kW IOTs. In any case the combination scheme will be a traditional one. The call for tender for a complete amplifier, based on IOTs, is in progress. The new installation is foreseen end of 2003-beginning of 2004.