Summary of the 1st Session
New Projects
Chairman : Michele Svandrlik

Three talks in the New Projects session covered the RF systems of the two synchrotron light sources in construction in Europe, Diamond and Soleil, and of a future project, namely the upgrade of PETRA-III to a synchrotron light source. Further two talks were related to the new trends in light sources, the Energy Recovery Linac Prototype (ERLP) at Daresbury and the HoBiCaT Test facility at BESSY, in view of the BESSY FEL project.

From the presentations of the synchrotron light sources under construction it was evident how the trend towards new technologies, namely superconductivity for the main storage ring RF system, is nowadays well established. The choice of Diamond has been for a Cornell-type cavity, while Soleil has confirmed the solution with the two-cell Soleil-type cavity. In both cases it was necessary to re-optimize the coupling of the power window, which is fixed; in Diamond for the three different foreseen operation modes, at different beam current intensities and with a different number of installed cavities (starting with two on day 1 and upgrading eventually the system to three cavities), while at Soleil this was required by the decision of installing a second cryomodule. While at Diamond the call for tender for the cavities has been assigned, Soleil is starting the refurbishment needed on the existing cryomodule and will launch the call for tender for the new one soon in 2004. To mention that both machines have gone for quite innovative solutions also for the power source: IOT-combination for Diamond and solid-state amplifiers for Soleil.

PETRA-III upgrade to a synchrotron light source shall be quick and low cost where possible. The RF system needs however to be upgraded. First idea is to reduce the number of installed cells, to limit the HOM impedance, to 2x6 7-cell cavities, compared to the existing 2x8 7-cell cavities. This would allow to provide the required beam power within the limit of 150 kW per RF window. However they are thinking also to different solutions with single cell cavities or superconducting ones.

The point about the RF window power limit triggered an alive discussion. Also choices at Soleil and Diamond had to take into account the power limits of the existing windows, 200 kW for Soleil and 300 kW for Diamond. The basic question is if this limits are real maximum limits, or if they are settled by safe and reliable operation needed for the systems. Since the discussion came back on this point also in a following part of the workshop, in the final session it was decided to look for a European collaboration to explore the limits in the RF power coupler design. A possible power coupler test stand will soon be available at Daresbury Laboratory, in the frame of the ERLP project.

ERLP has to be built in the next three years with the aim of developing core skills and practice in view of the ambitious 4GLS construction. Among the major

challenges of ERLP, the development of high brightness and high current photoinjectors and the settlement of superconducting linac technology. The photoinjector gun is under development. It will be based on the JLAB ERL design, while all interesting parts will be constructed in house. The superconducting linac will use the ELBE Tesla cryomodules. Time schedule and performance of ERLP are very challenging, particularly if one consider that it simply must work, in view of 4GLS.

Another challenging experimental program is foreseen at the HoBiCaT test facility, at BESSY. The 2.3 GeV superconducting linac for the BESSY FEL will be based on TESLA pulsed technology upgraded to CW operation. Therefore several issues have to be sorted out, like gradient, bath temperature, cryogenic load, microphonics, RF system, input couplers. For that purpose the HoBiCaT test facility is under construction. It will host a cryomodule suitable to host two Tesla cavities connected to a 4.2 K liquid helium cryoplant, with the possibility of operating at 1.8 K. The power source will be first a 10 kW klystron, which will then be upgraded to a 20 kW IOT based amplifier. First tests are scheduled early 2004.