Session 4 - CAVITIES – summary by Marco Pedrozzi

During this session dedicated to the cavity technology for synchrotron light sources, two main tendencies for the near future came clearly to view. First the efforts at Bessy to bring into operation the HoBiCat test facility for the new Super Conducting linac structures for FEL applications, and second the progress with the HOM damped Normal Conducting cavities for storage ring based light sources.

The community is showing since some years a growing interest in to the linac based FEL as coherent light sources for soft and hard X. The TESLA SC linac technology developed at DESY is becoming today the reference in this domain. For the Bessy FEL it is foreseen to modify the standard DESY structure for cw operation and a large cryostat called HoBiCat has been built to test the SC accelerating cavities. The purpose of the facility is to test the stability of the TESLA cavity in cw regime, in particular the possible compensation techniques concerning microphonics and the input coupler should be tested. During the first tests made with HoBiCat and a 9 cell cavity delivered by the industry the target quality factor and a target cw input power of 5kW for the coupler have been successfully reached.

Because of the high average currents in the synchrotron light source storage rings, the RF community has to face since Years the problem of couple bunch mode instabilities (CBI) generated by the high order mode (HOM) of the accelerating cavities. The large iris diameter of the Super Conducting cavities simplifies the implementation of coupler designed in order to reduce the HOM impedance below the instability threshold. For this reason few new facilities as Soleil and Diamond decided to chose this technology. Nevertheless the operation of a SC cavity implies a solid cryogenic infrastructure and can have a strong impact to the machine down time in case of failure. In this context a Normal Conducting HOM damped cavity could be an interesting alternative for a storage ring based synchrotron light source. During this session three presentations reported on the first operational results of the European HOM damped cavity at 500 MHz and the first deign studies made at ESRF for a 352 MHz cavity. The encouraging test made at DELTA demonstrated the good behavior of the European cavity. CBI modes related to the cavity HOM weren’t observed during the tests, but some structural weakness and an high pressure during operation (due to the cavity large volume) have been observed. In parallel a new design of the HOM dampers has been performed assuming a ferrite loaded homogeneous circular wave guide instead of a tapered wave guides. The simulation result shows a factor 4 possible improvement for the HOM damping rate.