HOMSC12 Programme

Day 1 - 25/06/2012

0800 - 0830 Transport from Doubletree Hotel to Cockcroft Institute

0830 - 0900 Registration

0900 - 0910 Logistics and Introduction to the Workshop
        Roger Jones - University of Manchester/Cockcroft Inst.

0910 - 0925 Welcome to Cockcroft Institute
        Swapan Chattopadhyay - Cockcroft Institute

0925 - 0940 Welcome to ASTeC
        Susan Smith - STFC

0940 - 0940 Plenary Session - Chaired by Vyacheslav Yakovlev

0940 - 1020 Higher-order modes in the Project-X Linac
        Vyacheslav Yakovlev - Fermilab

1020 - 1040 Refreshment break

1040 - 1050 HOM Damping Requirements for the Cornell ERL
        Matthias Liepe - Cornell University

1050 - 1120 HOM damping in the ERL main linac:
        Cavity design through first horizontal test
        Nicholas Valles - Cornell University

1120 - 1200 Higher-order modes in parallel-bar deflecting/crabbing cavities
        and high-velocity spoke cavities
        Jean Delayen - Old Dominion University

1200 - 1340 Luncheon + Tutorials

1230 - 1250 Tutorial - The Use of HFSS for the Design and Analysis of HOM’s
        in SCRF Accelerating Structure
        Ian Shinton - Honorary associate of the University of Manchester
1250 - 1310 **Tutorial - The GdfidL Electromagnetic Fields Simulator**  
Inna Nesmiyan - University of Manchester/Cf

1310 - 1330 **Tutorial - The ACE3P Suite of high Performance Parallel EM Codes for the Design and Analysis of HOM's in SCRF Accelerating Structures**  
Ian Shinton - Honorary associate of the University of Manchester

1340 - 1540 **Working Groups (see separate agenda)**

1540 - 1610 **Refreshment break**

1610 - 1745 **Working Groups (see separate agenda)**

1745 - 1815 **Transport to Hotel**
Day 2 - 26/06/2012

0815 - 0900 Transport from Doubletree Hotel to Cockcroft Institute

0900 - 0900 Plenary Session - Chaired by Ulla van Rienen

0900 - 0915 Diagnostics based on HOMs in Superconducting Cavities at FLASh/XFEL
Roger Jones - University of Manchester/Cockcroft Inst.

0915 - 0940 A study of beam position diagnostics with HOM in the 3.9GHz cavities at FLASh
Pei Zhang - The University of Manchester / DESY

0940 - 1020 HOMs in the BNL ERL SC Five-cell Cavities
Harald Hahn - BNL

1020 - 1040 Refreshment break & Group Photograph
(please convene in the Atrium)

1040 - 1120 Unwanted Mode Damping in SRF Deflecting/ Crabbing Cavities
Graeme Burt - Lancaster University

1120 - 1200 SRF Cryomodule Development for ERL Applications
Peter McIntosh - STFC

1200 - 1340 Luncheon + Tutorials

1230 - 1300 Tutorial - Introduction to computations using the code VORPAL
Jonathan Smith - Tech-X UK Ltd

1340 - 1540 Working Groups (see separate agenda)

1540 - 1610 Refreshment break

1610 - 1710 Tour of Accelerator Facilities of Cockcroft and Daresbury Laboratory

1710 - 1740 Working Groups (see separate agenda)

1745 - 2200 Banquet at Ruthin Castle and Student Poster Prize announcement
Day 3 - 27/06/2012

0845 - 0930 Transport from Doubletree Hotel to Cockcroft Institute

0930 - 0930 Plenary Session - Chaired by John Corlett

0930 - 1010 Recent Experiences with XFEL-like Cryomodules
   Jacek Sekutowicz - DESY

1010 - 1025 HOM Damping for the Next Generation Light Source
   John Byrd - LBNL

1025 - 1040 Refreshment break

1040 - 1120 WG Summaries - Chaired by John Corlett

1120 - 1200 Closeout

1200 - 1340 Luncheon + Tutorials

1230 - 1300 Tutorial - Advanced computations using the code VORPAL
   Jonathan Smith - Tech-X UK Ltd
HOMSC12 Working Groups

DAY 1 | 1340 Working Groups A, C and D combined Walton Rooms

1340 - 1405 Cavity design and HOM damping strategies for the BERLinPro ERL project
Axel Neumann - Helmholtz Zentrum Berlin

1405 - 1425 Development of the HOM coupler and the rf feedthrough for cERL injector at KEK
Ken Watanabe - KEK

1425 - 1445 Status of SiC-Based High-Power Waveguide Dampers R&D for the Short –Pulse X-Ray Project at the Advanced Photon Source
Alireza Nassiri - ANL

1445 - 1505 HOM considerations for the TRIUMF eLINAC
Philipp Kolb - TRIUMF

1505 - 1525 Development of SRF gun and HOM consideration at BNL
Lee Hammons - Brookhaven National Laboratory

1525 - 1540 Discussion

1540 - 1610 Refreshment break

1610 - 1630 HOM study and damper development for BEPCII SC cavity
Fan-bo Meng - Institute of High Energy Physics

1630 - 1650 HOM damping Requirements at the European XFEL
Nicoleta Baboi - DESY

1650 - 1705 HOM damping in the Cornell ERL SRF injector module:
HOM measurements and high current beam operation
Matthias Liepe - Cornell University

1705 - 1725 Status of the design and HOM calculations for the BERLinPro main linac cavity
Bernard Riemann - Center for Synchrotron Radiation / TU Dortmund University

1725 - 1745 Discussion
DAY 1 | 1340 Workings Group B and E combined Seminar Room C

1340 - 1400 Overview of HOM-based Diagnostics at FLASH and the European XFEL
   Nicoleta Baboi - DESY

1400 - 1420 HOM BPM Study at KEK-STF
   Ken Watanabe - KEK

1420 - 1450 Techniques for the Measurement and Analysis of HOM Signals for Diagnostics
   Stephen Molloy - ESS

1450 - 1510 HOM-BPMs and Phase Stability
   Nathan Eddy - Fermilab

1510 - 1530 Discussions

1610 - 1625 Simulations in the 3rd Harmonic ACC39 FLASH Module Focussed on Diagnostic Applications
   Ian Shinton - Honorary associate of the University of Manchester
DAY 2 | 1340  Working Groups B and E combined  
Seminar Room C

1340 - 1410  Discussion regarding damping HOM modes using active feedback  
Tom Powers - Jefferson Lab

1410 - 1440  Discussion Using electronic feedback for HOM suppression

1440 - 1510  Discussion RF receiver technology needs for HOM diagnostics  
John Byrd - LBNL

1510 - 1530  Discussion

DAY 2 | 1340  Working Groups A, C and D combined  
Walton Rooms

1340 - 1410  HOM damping requirements and accelerating structure design for ESS  
Rob Ainsworth - Royal Holloway, University of London

1410 - 1425  RF simulation codes used at Cornell University  
Nicholas Valles - Cornell University

1425 - 1445  State space model to compute external quality factors of accelerating structures  
Thomas Flisgen - University of Rostock

DAY 2 | 1445  Working Group C  
Walton Rooms

1445 - 1505  Simplified mathematical model for cavity-cavity coupling  
Stephen Molloy - ESS

1505 - 1525  Studies of electron emission and multipacting in HOM couplers  
Stephen Molloy - ESS

1525 - 1540  Discussion

1540 - 1610  Refreshment break

1610 - 1710  Tours
1710 - 1725  Beam dynamics in a low surface field cavity suitable for high gradient applications  
Inna Nesmiyan - University of Manchester/CI  

1725 - 1740  Particle Trajectories in 4 Rod Crab Cavities  
David Brett - University of Manchester/Cockcroft  

DAY 2 | 1445  Working Group D  
F26  

1445 - 1505  Cornell HOM load Research and Development  
Nicholas Valles - Cornell University  

1505 - 1525  Development of Demountable Damped Cavity  
Taro Konomi - Institute for Molecular Science  

1525 - 1540  Discussion  

1540 - 1610  Refreshment break  

1610 - 1710  Tours  

1710 - 1730  HOM damping schemes for the parallel-bar cavity  
Jean Delayen - Old Dominion University  

1730 - 1740  Discussion
Unwanted Mode Damping in SRF Deflecting/ Crabbing Cavities

Graeme Burt
Plenary

As deflecting and crab cavities do not use the fundamental acceleration mode for their operation, the spectrum of unwanted modes is significantly different from an accelerating cavity. The fundamental acceleration mode is now unwanted and can cause energy spread in the beam, in addition this mode is often close to or at a lower frequency that the deflecting mode making it difficult to damp. This is made more complex in some of the compact crab cavities as there small beampipes often attenuate the fields very sharply. In addition in some crab cavities there can be an orthogonal transverse mode similar to the deflecting mode, known as the same order mode. The degeneracy of these modes must be split by polarising the cavity and if the polarisation is not large enough, dampers should be placed at the field null of the crabbing mode to effectively damp it.

Various concepts for dealing with unwanted modes in various SRF deflecting cavities will be reviewed with particular attention paid to the ILC and LHC cavities designed at the Cockcroft Institute.

HOM Damping for the Next Generation Light Source

John Byrd
Plenary

In this talk, I will lay out the parameters for our proposed machine at Berkeley and our thinking to date on HOM-damping for our CW cryomodules.
Higher-order modes in parallel-bar deflecting/crabbing cavities and high-velocity spoke cavities

Jean Delayen
Plenary

The parallel-bar cavity is is new compact design for a superconducting deflecting or crabbing cavity.

Among its several advantages is the absence of lower-order modes and a well-separated fundamental mode from all the high-order modes. In spoke cavities, which are now being developed for high-velocity applications, the fundamental mode is also the lowest frequency mode. The higher-order mode properties of these two types of superconducting cavities will be presented.

HOMs in the BNL ERL SC Five-cell Cavities

Harald Hahn
Plenary

This laboratory has two five cell 704 MHz superconducting niobium cavities for use in the Brookhaven Energy Recovery Linac (ERL) and the planned Coherent Electron Cooling experiment. Several past measurements of the ERL at superconducting temperature produced a long list of higher order modes (HOMs). However, a number of undamped resonances with Q \( \gg 10^6 \) were found and their mode identification here consists of different bead-pull measurements on a copper replica of the ERL cavity which can be compared with Microwave Studio computer simulations. The bead pulling technique using a metallic needle or a dielectric Micarta short cylinder is described in great detail. Finding trapped resonances required probes into the cavity cells and thus is restricted to the copper model. The completed results for the lowest dipole and quadrupole passbands and the beam tube resonances are presented. The challenges encountered with the highest-Q resonances in the ERL BNL-1 cavity are discussed. The available copper model for the BNL-3 planned for the CeC experiment provides a unique opportunity to compare performance improvements attributable to design changes.
Notes
Diagnostics based on HOMs in Superconducting Cavities at FLASH/XFEL

Roger Jones
Plenary

Based on sampling a fraction of the amplitude of the HOMs radiated to the coupler ports, both beam position and cavity alignment can be inferred. Research already conducted in this area is reported and future prospects in the area are indicated. In particular, results achieved on the application of this technique to both the accelerating (1.3 GHz TESLA cavities) and bunch shaping (third harmonic) cavities at FLASH at DESY lab are summarised.

HOM Damping Requirements for the Cornell ERL

Matthias Liepe
Plenary

Cornell University is developing the superconducting RF technology required for the construction of a 100 mA hard X-ray light source driven by an Energy-Recovery Linac.

In this talk I review the requirements on HOM damping in the Superconducting RF cavities of the ERL main linac.
SRF Cryomodule Development for ERL Applications

Peter McIntosh
Plenary

The completion of the integration of an optimised SRF cryomodule for application on ERL accelerators has now culminated with its successful assembly, following an intensive 5 years of development evolution. The cryomodule, which incorporates 2 x 7-cell 1.3 GHz accelerating structures, 3 separate layers of magnetic shielding, fully adjustable and high power input couplers with fast piezo tuners, is nearing its installation readiness on the ALICE ERL facility at Daresbury Laboratory. It is intended that its implementation will permit operational optimisation for maximised efficiency demonstration, through increased Qext adjustment, whilst retaining both effective energy recovery and IR-FEL lasing. The collaborative design processes employed in completing this new cryomodule development are explained, along with the assembly and implementation procedures used to facilitate its proposed installation on the ALICE ERL facility at Daresbury.

Recent Experience with XFEL-like Cryomodules

Jacek Sekutowicz
Plenary

In 2011 and 2012, we have performed tests of continuous wave and long pulse operation of the XFEL prototype cryomodules, which originally have been designed for short pulse operation. For the second tests cooling in the tested cryomodule was improved and new LLRF system has been implemented. In this contribution I discuss results of the RF test of these new types of operation, which can in the future extend flexibility in the time beam structure of the European XFEL facility.
HOM damping in the ERL main linac: Cavity design through first horizontal test

Nicholas Valles
Plenary

Cornell’s ERL will be a high current light source requiring at least 100 mA beam current. The primary challenge to running an ERL with such high current are coherent effects from higher order-modes that lead to beam break up. We discuss the methods used to design a robust cavity satisfying design constraints and optimized for maximum beam break up current and present the first results of the prototype cavity installed in a horizontal test cryostat.

Higher-order modes in the Project-X Linac

Vyacheslav Yakovlev
Plenary

Project X is a proposed high-intensity H– accelerator complex that aims at providing high intensity beams for a diverse physics program which includes neutrino, kaon and muon-based precision experiments. Project X is based on a 3 MW, 1 mA superconducting linac operating in continuous wave (CW) mode, which accelerates a beam up to 3 GeV. Results of analysis are presented for the longitudinal and transverse effects of High-Order Mode (HOM) excitation in the superconducting acceleration RF cavities of the CW proton linac of the Project X facility. Necessity of HOM dampers in the SC cavities of the linac is discussed for different options of the linac operation.
A study of beam position diagnostics with HOM in the 3.9GHz cavities at FLASH

Pei Zhang
Plenary

Higher order modes excited by the beam in an accelerating cavity contain transverse beam position information. We plan to make use of the dipole modes induced in the third harmonic 3.9GHz cavities at FLASH for beam alignment and measurement of transverse beam position.

Due to the dense spectrum of modes and the couplings among cavities, it is considerably more challenging for the realization of the principle previously proved in TESLA 1.3GHz cavities. A specially designed test electronics based on down-converting principle is used to study various modal options for position diagnostics pinned down by previous studies. Present experiments suggest a resolution of 50 μm accuracy in predicting local beam position in the cavity and a global resolution of 20 μm over the complete module.

HOM damping requirements and accelerating structure design for ESS

Rob Ainsworth
Working Group

The European Spallation Source (ESS) linac will consist of three families superconducting RF cavities to accelerate protons to the required 5 MW for collision with the target. Beam induced HOMs in these cavities may drive the beam unstable and increase the cryogenic load, severely limiting the operating of the linac. The effect of these modes on the beam quality is investigated in detail using a numerical code dedicated to beam-HOM interaction.
Notes
HOM Damping Requirements at the European XFEL

Nicoleta Baboi  
Working Group

The European XFEL will accelerate short electron bunches to a maximum energy of 17.5 GeV. Two types of accelerating cavities will be built in: TESLA 1.3 GHz cavities and 3rd harmonic 3.9 GHz cavities. The HOM damping methods and requirements will be discussed. Simulations and measurements at FLASH will be shown.

Overview of HOM-based Diagnostics at FLASH and the European XFEL

Nicoleta Baboi  
Working Group

At FLASH, HOM-based beam position diagnostics demonstrated a resolution below 10 um for 1 nC bunches. These monitors have been also used for measurement of the cavity alignment in the cryo-module. A proof-of-principle of the measurement of the beam phase wrt RF has also been made at FLASH. Currently, prototype electronics are under design at FNAL for the 3.9 GHz cavities. At the XFEL HOM-based position and phase diagnostics is also planned. The principle, results, plans and challenges will be discussed in this talk.

Particle Trajectories in 4 Rod Crab Cavities

David Brett  
Working Group

As part of the HL-LHC upgrade it is planned that crab cavities will be installed into the machine to control and increase the luminosity. Current tracking studies have been carried out using an idealised Hamiltonian. The objective of this study is to compare and contrast the beam dynamics of a real 4 rod crab cavity with that of the idealised Hamiltonian.
Discussion RF receiver technology needs for HOM diagnostics
John Byrd
Working Group

HOM damping schemes for the parallel-bar cavity
Jean Delayen
Working Group

HOM-BPMs and Phase Stability
Nathan Eddy
Working Group

The principle of the HOM-BPM relies on identifying high order dipole modes generated by the beam. The basic idea is very similar to a cavity BPM but much more difficult in practice as the modes are not well controlled and can be very complicated. The Singular Value Decomposition technique has been shown to provide reasonable results in cases where standard analysis techniques have difficulty. The downside to the SVD technique is it requires beam based calibration which is very sensitive to the overall phase drifts in the electronics. The current understanding of these issues and possible mitigation techniques will be discussed.
State space model to compute external quality factors of accelerating structures

Thomas Flisgen
Working Group

The design of HOM couplers requires the efficient calculation of external quality factors. Generally, the couplers are designed such that the accelerating pi mode of the cavity has a large external quality factor, whereas the external quality factor of the remaining modes should be as small as possible. The direct calculation of the external quality factors involves the solution of a large and complex eigenvalue problem. As an alternative these quality factors can be acquired based on a pole fitting of the S-parameters. In this talk, a different approach is presented. Based on real eigenmodes of the structure a state space model is derived. In a post-processing step the terminals of the state space model are matched with their respective wave impedances. In a following step, the external quality factors are computed from the eigenvalues of the comparably small state matrix of the state space equation.

Development of SRF gun and HOM consideration at BNL

Lee Hammons
Working Group

This talk provides an overview of the Energy Recovery LINAC at Brookhaven with particular emphasis on the development of an SC electron gun and the HOM considerations with regard to the gun. The gun design is unique and HOM damping was a key factor in the design process. In addition, a unique ceramic/ferrite beampipe damper will be incorporated into the design to provide for further HOM damping.
HOM considerations for the TRIUMF eLINAC

Philipp Kolb  
Working Group

The central part of the Advanced Rare Isotope Experiment Laboratory (ARIEL) at TRIUMF is a 50 MeV electron LINAC. This LINAC will complement the existing rare isotope program in producing rare isotopes via photo fission. Upgrade plans for the future include a ERL recirculation path to excite a FEL or to accelerate the beam further. This makes it necessary to evaluate the effects of HOMs on the beam to avoid beam break up. The RF cavity for the eLINAC is based on the TESLA cavity with modifications to accommodate our requirements. For acceleration of 10mA electrons the 1.3 GHz 9cell cavity should perform at a Q of >= 10^10 at a gradient of 10MV/m, thus requiring 100kW RF power in cw. To avoid beam break up a dipole shunt impedance of less than 10MOhm is required, a lower goal of 1MOhm was set in the design phase to provide enough margin of error. The design relies on beam line absorbers to reduce the shunt impedance of potential dangerous modes. CESIC was identified as potential candidate to be used as damper and tests to verify this material are being done.

Topics of this talk include the ARIEL design including the eLINAC layout, BBU and HOM simulations and the tests on CESIC as a damping material.

Development of Demountable Damped Cavity

Taro Konomi  
Working Group

We have designed a new HOM free cavity named Demountable Damped Cavity (DDC) for the ILC R&D. DDC has two design concepts. The first one is an axial symmetry to eliminate kick off effect by HOM coupler itself. DDC is applied coaxial structure along the beam axis to make strong coupling with HOM. HOM is damped on RF absorber at the end of coaxial waveguide and the accelerating mode is reflected by the choke filter mounted on the entrance of coaxial waveguide. The second concept is demountable structure which can make cleaning of end group easy in order to suppress the Q-slope problem at high field.

We simulated the DDC feature from many side. We fabricated single DDC. Vertical test was done. In this workshop, we will present the results of them.
HOM damping in the Cornell ERL SRF injector module: HOM measurements and high current beam operation

Matthias Liepe
Working Group

Cornell University has developed a SCRF injector cryomodule for the acceleration of high current, low emittance beams in continuous wave operation. This cryomodule is based on superconducting RF technology, and is currently under extensive testing in the Cornell ERL injector prototype with CW beam currents exceeding 50 mA. Strong damping of Higher-Order-Modes in the cavities is essential for high beam current operation, and is achieved by beamline RF absorber located at cryogenic temperatures in the beam pipe sections between the cavities. This talk gives an overview of the experience gained during the high beam current operation of the cryomodule.

HOM study and damper development for BEPCII SC cavity

Fan-bo Meng
Working Group

In the presentation I will discuss: 1) HOM study on BEPCII SC cavity: the physics requirement for the HOM impedance, simulation of HOM impedance, method to lower the HOM impedance. 2) design and fabrication of HOM damper: some important points during the fabrication. 3) test of HOM damper: low power test and high power test.

Techniques for the Measurement and Analysis of HOM Signals for Diagnostics

Stephen Molloy
Working Group
Simplified mathematical model for cavity-cavity coupling

Stephen Molloy
Working Group

Studies of electron emission and multipacting in HOM couplers

Stephen Molloy
Working Group

Status of SiC-Based High-Power Waveguide Dampers
R&D for the Short –Pulse X-Ray Project at the Advanced Photon Source

Alireza Nassiri
Working Group

High-power waveguide dampers have been designed and prototyped for the Short-Pulse X-ray (SPX) cavities at the Advanced Photon Source (APS). The cavities will operate at 2815 MHz in TM110 dipole mode. Therefore, higher-order mode (HOM) and lower-order mode (LOM) in-vacuum dampers have been designed to satisfy broadband damping required for the APS storage ring operation. The damper designs and high-power experimental results will be discussed.
Beam dynamics in a low surface field cavity suitable for high gradient applications

Inna Nesmiyan
Working Group

Here we simulate the beam dynamics implications of long-range wakefields in a new accelerating cavity for linear collider applications. This superconducting cavity is based on the previous low loss design.

Cavity design and HOM damping strategies for the BERLinPro ERL project

Axel Neumann
Working Group

The Berlin Energy Recovery Linac Project (BERLinPro) is designed to demonstrate CW LINAC technology for 100-mA-class ERLs with a low normalized emittance beam of 1mm mrad at a pulse length of 2ps. For the different sections of the accelerator - SRF photo-injector, booster module and main linac in the recirculator- the operating boundary conditions for the cavity design vary from high current, high beam loading to a high current, zero net beam loading environment. Thus the requirements for quality factor and peak fields are quite different for these three cavity types as well as the HOM damping techniques applied.

In this presentation a short overview of BERLinPro, the cavity design and HOM damping strategies will be presented.
Discussion regarding damping HOM modes using active feedback*

Tom Powers
Working Group

Christopher Tennant’s Ph. D. Dissertation [1] is a uniquely comprehensive work covering beam breakup and higher order modes in the JLAB Free Electron Laser. The JLAB FEL is an energy recovered linac based machine that is capable of operating at 10 mA CW. One of the cryomodules is a prototype CEBAF upgrade cryomodule. Each of the 7-cell elliptical cavities in this cryomodule has two ILC/SNS style HOM dampers. The work that we will discuss relates to the measurements that he made that correlated beam current and measured HOM-Q’s. Additionally we will review and discuss the methods that he used to damp the excited mode using an active feedback technique applied to one of the HOM couplers.


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Status of the design and HOM calculations for the BERLinPro main linac cavity

Bernard Riemann
Working Group

The Berlin Energy Recovery Linac Project (BERLinPro) is designed to develop and demonstrate CW LINAC technology and expertise required to drive next-generation Energy Recovery Linacs (ERLs). Strongly higher order mode (HOM) damped multi-cell 1.3 GHz cavities are required for the main linac. The cavity under study is an integrated design of the Cornell base cell with JLab HOM waveguide couplers. Modifications to the end group design have also been pursued, including the substitution of one waveguide by a HZB-modified TTF-III power coupler. In this talk the progress in HOM calculations to avoid beam-breakup instabilities for the favored cavity structure will be presented.

Simulations in the 3rd Harmonic ACC39 FLASH Module Focussed on Diagnostic Applications

Ian Shinton
Working Group

This study is primarily focused on the development of a HOM-based BPM system for the ACC39 module currently installed and in operation at FLASH and due to be installed at XFEL. Coupled inter-cavity modes are simulated together with a limited band of trapped modes. A suite of finite element computer codes (including HFSS and ACE3P) and globalised scattering matrix calculations (GSM) are used to investigate the modes in these cavities.
RF simulation codes used at Cornell University

Nicholas Valles
Working Group

I discuss the EM codes used at Cornell in the SRF group for our accelerator work. The relative strengths of the codes are presented and a few examples applying the codes are discussed.

Cornell HOM load research and development

Nicholas Valles
Working Group

Development of the HOM coupler and the rf feedthrough for cERL injector at KEK

Ken Watanabe
Working Group

The injector cryomodule for cERL is under developing at KEK. This cryomodule with three L-band 2-cell cavities will be constructed until June 2012. Three 2-cell cavities with five HOM couplers were fabricated at May 2011. The vertical tests of these cavities were tested from June 2011 to Mar 2012, and the rf feedthroughs with high thermal conductivity for HOM coupler were also developed to achieve 15 MV/m operation at CW in cryomodule. The results of vertical test of the 2-cell cavities with HOM pick-up will be reported in this report.
HOM BPM Study at KEK-STF

Ken Watanabe
Working Group

The STF accelerator (Superconducting accelerator Test Facility) at KEK was built at Feb 2012 to demonstrate high brightness X-ray generation by inverse laser Compton scattering for Quantum Beam project supported by MEXT in Japan. The accelerator has one L-band 1.5 cell RF gun with Cs2Te photo cathode and one capture module with two L-band 9-cell cavities (TESLA-like) to accelerate the 1 ms long pulse electron beam to 40 MeV. The bunch charge and bunch length are 62 pC and 10 ps. The bunch spacing is 6.15 ns (162.5 MHz). The 162500 bunches electron beam can accelerate in 1 ms rf pulse.

The HOM BPM study was started from end of April 2012 to use this capture module. A basic data is under taking using by fast oscilloscope.

The status of STF accelerator and the progress of HOM BPM study will be presented in this talk.