TTC2022 Aomori, TESLA Technology Collaboration

Tuesday, 11 October 2022 - Friday, 14 October 2022

Link Station Hall Aomori

Scientific Programme

The list of **Working Groups** and their charges is shown below. If you would like to contribute a presentation, please contact the WG conveners.

WG-1: Progress of High Q and High Gradient activities

Conveners: Mathieu Omet (KEK), Christopher Bate (DESY), James Maniscalco (SLAC), (SPC: Detlef Reschke (DESY))

The scope of this working group is to discuss the most recent results related to pushing Niobium towards higher Q and higher gradient. A summary report of the latest two TTC High-Q/High-G WG meetings held in May and August should be presented as an opening talk. Advances in understanding material evolution under established but also newly developed heat treatments, such as N-Infusion, N-Doping, Low-T Bake and Mid-T Bake, the differences and advantages of low-temperature EP compared with conventional EP, and current results on flux-expulsion studies should be discussed. The working group should also discuss methods/results towards higher gradient performance for future pulsed-mode accelerators. Topics should include the achievable maximum gradient, the yield rate of high gradient, reliable cavity fabrication methods, cost reduction of niobium sheets and new ideas for achieving higher gradients. The presentations and discussion should include results from both elliptical and TEM mode cavities. The interplay between theoretical approaches and experiments should be emphasized. Results from sample and cavity studies (different cavity types and frequencies) which could help to establish a core understanding should be included.

WG-2: Low beta machine commissioning and operational experience

Conveners: Kai Masuda (QST), Zhongyuan Yao (TRIUMF), Jose Alberto Rodriguez (CERN), (SPC: Bob Laxdal (TRIUMF))

Several SRF projects related to low-beta TEM-mode cavities including QWR, HWR and Spoke cavities are in the commissioning or early operation stage. The scope of this working group is to present and discuss lessons learned during hardware testing, beam commissioning and during operation. Topics should include experience with both cavities and cryomodules as well as with the cavity ancillaries (tuners, couplers, rf and cryogenic systems). Technical issues would include multipacting, frequency control, field emission, quenches and the associated mitigations for each.

WG-3: Applications and cooling schemes for Nb3Sn- cavities

Conveners: Kensei Umemori (KEK), Uttar Pudasaini (JLab), Oliver Kugeler (HZB), (SPC: Hiroshi Sakai (KEK))

Research and development towards the use of Nb3Sn in SRF cavities has been carried out in many worldwide laboratories. Coating technologies of Nb3Sn on Nb have remarkably progressed, and Nb3Sn single cell cavities at 1.3GHz and 4.2K have been shown to have similar performance to Nb

cavity at 2K in excess of 20MV/m. The Nb3Sn coating process has also been extended to 1.3GHz multi-cells where good performances have been obtained. Finally sample preparation using different processes are being developed to help further push the technology. The WG-3 scope should include reports on issues and progress on 1.3GHz single cell and 9-cell cavities coated with Nb3Sn, on the treatment of cavities at other frequencies and on the progress towards the development of new coating processes using samples. In addition, several scientific and industrial SRF cavity applications using Nb3Sn technology have been proposed. WG-3 should also consider input and discussion on the challenges of operating Nb3Sn cavities in an on-line accelerator including progress towards using cryo-coolers and conduction cooling to reach operational temperatures. The cryomodule design with an efficient conduction-cooling method and the thermal performance in both simulations and experiments should be discussed.

WG-4: Availability and operability of existing accelerators compared to their design goals

Conveners: Michiru Nishiwaki (KEK), Rong-Li Geng (ORNL), Francesco Grespan (LNL), (SPC: Camille Ginsburg (Jlab))

Many SRF accelerators for electrons and hadrons have been under long term beam operation (more than 5 years). In addition to the cavity quality factors and gradients, the availability and operability of the SRF accelerator are key metrics for performance. The WG-4 scope includes presentations and discussions on the experience gained operating existing SRF accelerator facilities including long term cavity performance, key sources of down-time and key sources of procedural time. Discussions would include issues such as field emission, multipacting, trapped flux, cryogenic and rf issues and issues with cavity ancillaries. Also, of interest are the development of mitigations designed to reduce down-time and improve operability including maintenance planning, high level applications and on-line processing. The causes of the performance limitations and the trip rate during beam operation should be presented.

Plenary session

Plenary talk -1: “Commissioning of LCLS-2 cryomodules”, Sebastian Aderhold (SLAC)
Plenary talk -2: “SRF activities discussed within Snowmass and European HEP strategy process”, Sergey Belomestynyk (FNAL) and Hans Weise (DESY)
Plenary talk -3: “Progress of the RAON project in Korea”, Myeun Kwon (IBS)
Plenary talk -4: “Operations experience with accelerating H- through prototype low-beta cryomodules for PIP-II”, Donato Passarelli (FNAL)
Plenary talk -5: “FRIB commissioning and first operation”, Sang-hoon Kim (FRIB)
Plenary talk -6: “Report of meetings of Thin Film working group and Thin Film workshop”, Anne-Marie Valente-Feliciano (Jlab) and Marc Wenskat (DESY)
Plenary talk -7: “Summary of ERL workshop on SRF activities”, Hiroshi Sakai (KEK)
Plenary talk -8: “European XFEL – Experience with 5 years of operation”, Hans Weise (DESY)

(25 min. talk + 5 min. discussion for each)

Hot topics

Hot topic: “Global helium resource status and future prospect”

Co-convener: Akira Yamamoto (KEK/CERN), Catherine Madec (CEA)
Dimitri Delikaris (CERN): „Global He resource status and the future prospect in Europe“
Reiko Sagiyama (Univ. Tokyo): “Global He resource status and the future prospect in Asia/Japan”

(30 min. talk + 15 min. discussion for each)

Special Seminar

Special Seminar-1: “ Availability of high purity Niobium for SRF application”, Shuichi Irumata (JX Nippon Mining & Metals Corporation)
Special Seminar-2: “ Japanese ADS program: Current status and future plan” , Fujio Maekawa (JAEA)

(35 min. talk + 15 min. Discussion for each)